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SOUTHERN AGRICULTURIST.

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PART I.

ORIGINAL CORRESPONDENCE.

ART. LXXIII.—*An Address delivered before the Agricultural Society of South-Carolina, at the anniversary meeting, August 20th, 1833; by* DANIEL K. WHITAKER.

I CANNOT feign a degree of diffidence, which I but too sensibly feel, and which, perhaps, I ought to feel in addressing you, on this occasion. It is only a very few years, since I became connected, in any shape, with the Agriculture of the Southern country, and from that period to the present, my attention has been so much divided between my interest as a planter, and the pursuit of a profession, that I have had but little time and meagre opportunities to speculate on the subject of Agriculture, or to extend my inquiries, in so interesting a department, to any results particularly worthy of notice. I cannot, therefore, when I reflect on it, avoid being astonished at the extreme temerity which induced me to accept an appointment which makes it my duty, now, to address an assemblage of experienced planters and educated gentlemen in reference to an important concern, with which all of you, probably, are in every respect infinitely better acquainted than I possibly can be. A sense of my own deficiency, however, has taught me the inestimable value of correct information, and has led me to turn my attention more particularly to a topic, to which on the present

occasion, I respectfully beg leave to invite yours, viz: The Claims of Agriculture to be regarded as a Distinct Science. However incompetent I may be, to do justice to this subject, I cannot regard it as one of merely idle curiosity, or as simply furnishing a theme for popular declamation. It appears to me, I confess, to embrace considerations of much magnitude to us, both as men and citizens—to involve, in a word, the serious issue, whether by far the most important interest of civilized life, is to be best promoted by the ignorance, or by the intelligence of those who support it.

By a Science, I understand a collection of the laws of nature in reference to any subject; and by the Science of Agriculture, if it be proper so to distinguish it, I understand, strictly speaking, a collection of those laws as applicable to the culture of the earth, in reference to its vegetable products. Here there is no latitude for imagination to indulge in its own creations. The mind is closely confined within certain fixed limits which are as immovable as the everlasting hills. The laws of nature—who can resist their force? Who can vary their operation? They are the laws of the almighty Architect himself. If we throw a stone into the air, it will always, from the force of the gravitating principle, fall downwards to the earth. If we change the relations which numbers bear to each other, by any of the ordinary processes of arithmetic, we may calculate, with unerring certainty, as to the result of our operations. The same regularity which characterises the action of the laws of nature, in general, marks also the operation of those laws in particular, which govern the interesting science of which I speak. Under the same circumstances, we may be sure that the same causes will always produce the same effects, whether reference be had to the Science of Agriculture, or any other science. There are certain general principles, certain fundamental axioms, which constitute the basis of this science, which run out into all its ramifications, and affect more or less seriously all, even its minutest details. These elementary laws must be investigated, must be studied, must be understood. He who attempts to cultivate the earth, without acquiring this important information, has altogether mistaken his vocation, or the first duties belonging to it. He may be the owner of rich and

extensive territories, but has no more right to call himself an agriculturist, than he who attempts to teach algebra, without a knowledge of its first principles, is entitled to claim and to receive the public confidence, as a teacher of the mathematics. He is a mere driveller, a rash adventurer, and his efforts to distort nature which he does not understand, and force it from its steady, uniform course into artificial channels, will terminate, as they deserve to do, in utter disappointment.

In all discussions which have an immediate relation to the Science of Agriculture, it will be necessary to consider the process of vegetation as operated on and promoted by a two-fold influence, that resulting from the powerful action of the general laws of nature, and from the humbler, though no less important action of man, as uniformly accommodated to the laws of nature. Different methods of cultivation unquestionably do, and must exist in different countries, and in different sections of the same country, owing to the great variety that exists in climate, in soil, and in the nature of the plants themselves, which are the subjects of cultivation. But this diversity in culture by no means conflicts with that operation of the general laws of nature which is indispensable to the growth of all plants, nor discredits the utility of those general rules which science has laid down, and the experience of ages has justified, as applicable to their cultivation.

I. The first branch of our subject, then, has an indispensable reference to the great primordial laws of nature, and its methodical disquisition makes it my duty, at the outset, to inquire what are those laws of nature, those great first principles, a compilation of which constitutes, as is affirmed, the Science of Agriculture, at least so far as it is to be regarded a purely physical science? Do we know what those laws, those great elementary principles are? To this I reply, that to a certain extent, to an extent quite sufficient to establish the claims which I now set up, we are acquainted, well acquainted with those controlling and almost omnipotent laws of nature. Common sense, common observation, even, have grasped at some of them, and in this particular, necessity has been the fruitful mother of important discoveries. Science and philosophy have revealed others. We are not, therefore, led by the subject into a vast labyrinth, without being fur-

nished with a proper clue to conduct us back to the cheering light and refreshing breezes of heaven. Indeed the labyrinth has been long since explored, and we are now pursuing an even and straight forward course, gratified by our acquisitions, and animated by our hopes. To the question then, I answer, without evasion or circumlocution, that it is a law of nature governing this subject, a law more unalterable far than any of the famed laws of the ancient Medes and Persians, that certain great agents or elements of nature, viz: Air, Light, Water, Attraction, Gravitation, Soil, and occasionally, without doubt, Electricity, shall be necessary to advance and carry forward to perfection, every plant, tree, or flower, that springs spontaneously out of the earth, or that is cultivated by human efforts either for ornament, for food, or for the purposes of commerce. It is a law of nature, equally well settled, that no one of these agents or "agencies," powers or principles, except Electricity, shall act separately and independently from each and all the rest in the great economy of vegetation; that Light, for example, shall not act independently of Air, or that Air shall not act independently of Heat, or that Heat shall not act independently of Moisture, but that all of them together, as if animated by one soul and one spirit, shall co-operate for the promotion of one and the same object, and act in everlasting concert. It is a law of nature, that these agents of nature, while they act together with a beautiful consent, resembling the very harmony of the spheres, shall yet often act differently together, that is, that all of them shall have distinct provinces in which to act, and peculiar duties to perform in acting. It is a law of nature, for example, in respect to Air in the vegetable economy, that all plants shall be constructed with what are called air-vessels, and shall be so constructed, with a view to the absorption and evolution or respiration of Air, and that this fluid shall exert a constant and powerful influence through each and all the parts of plants, and shall promote the circulation of the juices through their various vessels. It is a law of nature, in this connection, and a wonderful law, that Air and plants of every order, shall exert a reciprocal action upon each other, that the leaves of plants shall evolve, throw off and add to the atmosphere certain gases or elastic principles, which are essential to the elementary constitu-

tion of the atmosphere, and absorb from the atmosphere gases or elementary principles which are necessary to the constitution, health, and vigorous growth of plants. It is a law of nature, regulating this intercourse between the atmosphere and plants, that the gases absorbed and those evolved, shall differ altogether as these phenomena take place by night or by day, in the dark or in the light, in the shade or in the sunshine—that in the day and in the light plants shall evolve or give off a subtle, impalpable principle, chemically denominated oxygen gas, constituting, in fact, the vital principle of the air, and that at the same time and in the same situation, they shall absorb what is called carbonic acid gas, the respiration of which, is deleterious to animal life and health; but that in the night and in the dark, the order shall be reversed, and the plants shall be constituted and disposed to give off carbon and absorb oxygen. It is a law of nature, that this alternate evolution from plants of gases of a diametrically opposite character shall be one great cause of a salubrious atmosphere by day, and of an unhealthy atmosphere by night. Thus if jars of flowers, or vases of plants be put in a close room at night, they will abstract, or absorb from the atmosphere a portion of the elastic principle which is necessary to support animal life, and will substitute a portion of a gaseous principle which is injurious to life, and thus render the atmosphere of the room unwholesome; but in the day time, *vice versa*. Thus, again, it is related of the inhabitants of one of the East India Islands, that wishing to raise the price of cloves, they cut down a large portion of their trees producing that spice, thinking, that by lessening the quantity, they would increase the value of the commodity. The consequence that ensued was a just punishment for their avarice and folly. That portion of the Island where the cloves grew, owing to the cutting down of the trees, which acted favourably upon the atmosphere, became so sickly, that the inhabitants could no longer reside there, and were obliged to abandon it.* It

* The truth of this opinion, however, has sometimes been controverted; The following are the views of a scientific gentleman, who was present at the delivery of this address: "On the whole I think it may fairly be questioned whether vegetation promotes health by the evolution of oxygen gas during the day, to such a degree, as to counteract the pernicious effects of the absorption of oxygen, and the evolution of carbonic acid gas during the night. This can only be ascertained by such a course of scientific experiments, as will

is a law of nature, that Light shall effect all the variations that take place in the colour of plants, and influence their occasional motion, according to their situation and degree of exposure. Every gardener, and every person at all acquainted with the habits of plants, is perfectly aware of the existence of this law. That part, for instance, of the succulent plant called celery, which, in cultivation, is exposed to the influence of the sun's rays, is of a beautiful green, while that part, which is excluded from the Light, is white or nearly so. Transplant any healthy lively plant, into a dark place, say a cellar, it will soon lose all its verdure and assume a pale and sickly hue, so much so, that in a short time, you will scarcely recognize it to be a plant of the same species. It will still continue to grow, and if there is any aperture, such as a small window, through which some scattering rays of Light may be transmitted, you will witness the occurrence of one of the most remarkable phenomena in the whole vegetable economy. The plant will actually bend its summit towards that solitary aperture, and, in its eagerness to search for and enjoy the Light, will continue to stretch itself in that direction, till it has attained to a very extraordinary and unnatural growth. It is a law of nature, that plants deprived of the influence of solar Light, shall not flourish—that their juices, upon a withdrawal of that influence, shall become deteriorated, and assume a watery saccharine character, and, upon being subjected to chemical analysis, shall no longer yield some of those essential materials, such as the volatile oils, that are peculiar to them. It is a law of nature, that Light shall act as a stimulus upon the irritative and sensitive parts of plants, particularly the leaves. This is proved by the expansion of flowers and leaves, and the nutation of flowers, as of the sun-flower, when under the influence of solar Light. And, however strange it may seem, it is a law of nature, that Light shall be indispensa-

demonstrate the exact change which atmospheric air undergoes, during the process of vegetable respiration—nay, of all the different plants and trees throughout the vegetable kingdom for a given time. A question hence arises as to the predisposing cause of disease, after cutting down the clove trees, in the Asiatic Island. It may, perhaps, have arisen, as it is generally supposed to do in this country, in consequence of admitting more freely the action of the sun's rays upon the earth,—thus producing a more rapid decomposition of animal and vegetable matter, which is the prolific source of the miasmata so injurious to health, and which, when brought to act intensely on the human system, is so often deleterious to life!"

ble to the respiration of some orders of plants. Thus the beautiful Mimosa, which has now become so common among us that we pass it by like any ordinary tree, and the humbler plant of the same genus, which derives its name from its sensibility to human touch, and many others, "close the upper surfaces of their opposite leaves together during the night, and the internal surfaces of innumerable flowers, which are their respiratory organs, are closed during the night, and thus unexposed both to light and air." It is a law of nature, that Heat, under certain circumstances, shall promote the fertility of the soil, and that under all circumstances, it shall increase the activity, and accelerate the growth and maturity of all orders of plants—that the spring time, when the atmosphere glows with a genial fervour, shall be the time to cast the seed into the ground—that the earth must be warmed to a certain temperature, or that nothing shall grow in it—that what are called cold soils, and which are not very permeable to the action of Heat, shall be uniformly, in their ordinary state, stubborn and unfruitful—that the green plant and the fragile flower shall sicken and wither and die, upon the approach of cold—that the frost shall nip them and cut them down—that in Autumn, their leaves shall drop, and that nothing, capable of vegetating, shall retain any portion of its freshness and its verdure, during the chills and snows of Winter, except a few culinary plants, and a few scattered, and perhaps, solitary evergreens. It is a law of nature, that the relative position of the sun to the earth, shall give rise to different orders of vegetation in different latitudes. Accordingly, the colder climates are uniformly meagre in their vegetable products, and extremely unfavourable to the culture of any plants that are not strictly indigenous to them. But, as you approach nearer to the more immediate empire of the sun, towards the tropical regions, the whole face of nature wears a materially different aspect. The heart thrills with new emotions and the eye is charmed with new and more agreeable prospects. The earth is more prolific. The trees are covered with a richer and a thicker foliage. The forests are decked with a greater variety of flowers. Hill and valley are covered with a carpet of deeper and more lasting green. A lengthened Summer affords better opportunities for the maturing of crops that are slowly matured, and for

a succession of crops that are rapidly matured. All nature exults and glories in a superabundance of life, and seems perpetually anxious to reproduce its creations under new forms of beauty and utility. The feathered tribes, which sweep, in vast numbers, through the heavens, are clothed with a plumage of beautifully variegated colours, and the groves, on all sides, resound with an almost perpetual chorus of animating and voluptuous voices. The useful and domestic animals, roaming at large in numerous droves, crop the never-dying herbage, and the deer bounding through the forest, and wild game, in abundance, of every order and every delicate flavour, reward the toil of the hunter. And there even man—intelligent man, from some dispensation of Providence in his favour, is, in certain respects, a more remarkable being. If his passions are more ardent, his memory is more rapid, and his imagination more creative and more vivid. The love of liberty, the hatred of oppression are his darling passions. His courage is daunted by no obstacles. He is instantly roused to action by great emergences, and, aided by the kindling and universal sympathy of his fellows, he proceeds rapidly and enthusiastically forward to the accomplishment of those objects which engross all the powers and affections of his soul. Such, I was about to say, is the case with South-Carolina, our own favoured soil, as compared with the colder and more sterile regions of the globe. We are almost literally inhabitants of the chosen residence of Flora, and as Italy has been sometimes called the garden of Europe, so South-Carolina, under a climate equally genial, and with a soil equally fertile, is emphatically the garden of the United States. To return, however, to nature's great code, from which I have a moment digressed. It is a law of nature, that Water, shall under some one of its different forms of rain, vapour, dew or mist, constitute the chief vehicle, by which the nourishment of plants is conveyed to their roots, and an indispensable solvent, by which it shall be concocted and prepared for their consumption:

> "Without fair culture's kind enliv'ning aid,
> Without parental suns and *genial showers*,
> And shelter from the blast, in vain we hope
> The tender plant should rear its blooming head,
> Or yield the harvest promised in the Spring."

It is a law of nature, in this connexion, that Water, even under its congealed form of snow and ice, shall, in cold climates, afford protection to the roots and bulbs of plants, and secure them from the destructive influence of the atmosphere. It is a law of nature, that Attraction shall be instrumental in preserving the forms of the aggregation of plants, in effecting the absorption of their fluids, and shall co-operate with Air and Water in changing their forms and products, in furnishing their food and rendering the earth a fitter receptacle for their roots. It is a law of nature, that Gravitation shall regulate and control the direction of the radicles and germens of plants and thus, as has been truly and beautifully said, "the same great law which preserves the planets in their orbits, is essential to the functions of vegetable life." It is a law of nature that Soil shall constitute a bed indispensable to the fixture of plants, and that the earth shall form a grand laboratory in which the process of vegetation, in the production of various plants, in different soils, shall be regularly carried forward. And finally, it is a law of nature, that Electricity shall constitute a powerful agent in promoting the more rapid germination of seed.* These are the great laws of nature, upon which the Science of Agriculture is founded, and upon which it confidently rests its claims to the rank of a Science, and of a highly important Science.

I have thus pointed out the great agents which nature employs in the important economy of vegetation. I have stated something of the peculiar province of those agents respectively, and in developing some of the laws of nature indicated by the uniform action, under certain circumstances, of those agents both upon the soil and the growth of plants, I have endeavoured to vindicate the claims of Agriculture to be regarded as a Science. It may be objected, however, that I have done nothing more than point out laws of nature which have given birth to certain

* In experiments made by means of the Voltaic Battery, Sir Humphrey Davy discovered, that "corn sprouted much more rapidly in water positively electrified, than in water negatively electrified; and experiments made upon the atmosphere, show that clouds are usually negative, and as when a cloud is in one state of electricity, the surface of the earth beneath, is in an opposite state, it is probable, that in ordinary cases, the earth is positive."

sciences, distinct altogether from the Science of Agriculture—that I have simply pointed out the bearings of those laws upon what I am pleased to call the Science of Agriculture, but have failed to establish the claims of Agriculture to a high and independent rank, as a distinct Science. To this I reply, that in my search after the laws of nature, I have not been impeded by the mere flimsy barriers which names alone have set up—that I have been willing to grasp at those laws wherever I could find them, and bring them within the province to which they properly belong, and where nature, and not man, has established their empire. The conclusion would be equally fair—indeed it would be the only fair conclusion, not that I have improperly trenched upon the boundaries of other sciences, and stripped off the laurels that belong to them, in order unjustly to elevate the Science of Agriculture; but that other sciences, in claiming for themselves entirely separate, honors, have disregarded the higher claims of Agriculture, and been themselves guilty of usurpation. The true adjudication of the respective claims, I apprehend to be this, that Agriculture is the great, parent, main Science, of which Physiology, Chemistry, Botany, Mineralogy, Pneumatics, and all other Sciences, as far, at least, as they are tributary to the culture of the earth, are simply the branches. The true, the thorough Agriculturist is more than a mere Chemist—he is more than a mere Botanist, or a mere Mineralogist—he is, in an extensive, and in the very best sense of the term, a Natural Philosopher.*

*The opinions advanced under this head of the Address have been adopted after strict investigation and upon mature reflection, and will be found to be fully sustained in different works of Priestly, Franklin, Sir Humphrey Davy and other eminent philosphers.

(To be continued.)

ART. LVII.—*Account of an Agricultural Excursion made into the South of Georgia in the winter of* 1832; *by the* EDITOR.

(Continued from page 466.)

Next to rice, the sugar-cane is the most valuable crop grown at "*Hopeton*," and Mr Couper has gone extensively into it, and incurred considerable expense in erecting a steam-mill of fourteen horse-power, with a double set of boilers, &c. The sugar establishment of "*Hopeton*," is the most extensive of any in Georgia, and of all we saw, (and we believe we saw all of any consequence) it is the best arranged. Before describing it, however, we will proceed to give the mode of cultivating the cane.

CANE CROP.

"*Preparation of Soil.*—The land should be throughly 'drained, and in deep and fine tilth. The mode of drain-'ing has already been described. (p. 363.)

"If the field to be planted in cane, has been the previous 'year in rice, it is turned up as deeply as possible early in 'the winter, covering the stubble as thoroughly as it can be 'done. It is kept in this state until required to be planted, 'when trenches five feet from centre to centre, eight inches 'wide, and two inches deep, are open to receive the cane.

"If the field was the previous year in cotton, the cotton 'beds are shaved down into the alleys, covering the trash, '&c. and forming a wide list. In performing this opera-'tion, care must be taken that the earth over the vegetable 'list is sufficiently deep, to afford a moist and close foun-'dation for the cane plants, otherwise they may, from a de-'ficiency of moisture, or the access of the air, take the dry 'rot. When the previous crop has been cane, the land is 'ploughed up and levelled, the old roots stacked in heaps, 'and the trenches opened five feet from centre to centre, 'eight inches wide, and two inches deep.

"The cane which has been reserved for seed, is then un-'covered, stripped and examined. The shrivelled and 'decayed joints are cut off, and the plants with defect in 'buds, are rejected. If the seed is very good, and the 'land rich, and in fine order, the plants are placed in 'two lines in the trenches, with intervals between the

'lines of from two to four inches, and between the plants 'of one-half of their length: the canes of one line being 'placed opposite to the vacant spaces of the other, thus '— — — — — — — — — — — — If the soil is not 'very rich, or in fine order, or if the seed is at all defective, 'the plants are made to touch each other in the lines, 'thus ——— ——— ——— ———. In both cases the butts of 'the canes are placed regularly in the same direction.

" Attention is paid so to place the plants that the buds 'or eyes may lie in a horizontal position ————, otherwise 'the lower buds when they vegetate are injured by the 'effort to regain the vertical direction. The placing of 'the plants having been completed, they are carefully cov- 'ered to the depth of from one to one and a half inches. 'Great attention is required in this operation, as the pro- 'tection of the plants from frost depends more on the close- 'ness than the depth of the covering. On friable clay 'lands I have found half an inch of earth an ample protec- 'tion during the late severe winters. The prevalent error 'is in covering too deep. When the soil is wet the plants 'are very liable to rot when they are laid deep, and I have 'generally found their soundness and healthful vegetation 'in the spring, to be in the inverse ratio of the depth of 'covering within the above limits. Direct experiments 'have been made on this subject, which have confirmed 'general observations. It is notorious that the earliest 'vegetation is at those points where paths crossing the beds 'have left the plants nearly bare. I have frequently ob- 'served plants vegetating early in the season, which had 'been dropped on the surface, and have been partially trod 'into the soil, the upper half of which were completely des- 'troyed by the cold, while the lower buds were vegetating. 'If from any cause the lands are covered with water after 'planting, the rotting of the canes will be less in propor- 'tion as the covering is light. If uncovered, canes, if im- 'mersed a foot deep in water, will remain with their vege- 'tating principle unimpaired for three months, during the 'winter. This has been proved by direct experiment, as 'well as accidental observations. If covered with an inch 'of soil, and then flowed, they will rot. If the covering is 'thinner, the rotting is less than when it is deep. I have 'invariably found the crop to come up well if the following 'circumstances are attended to:

"1. Have the soil well drained, and in fine tilth.

"2. Sound seed.

"3. Light but careful covering, *closely pressed to the canes.*

"4. Placing the canes an inch or two below the level of 'the land, so as to insure the lower sides being in close 'contact with a *moist* but not *wet* soil,

"The *time of planting* may be from the 20th of October 'to the 1st of March. In consequence of having full occu- 'pation in grinding until Christmas I have usually plant- 'ed between the 1st of January and 20th of February. 'The earlier the operation is performed, on well drained 'lands, the better, as the canes are safe when planted—they 'are slowly throwing out roots during the winter to sup- 'port the shoots when put out in the spring; the soil is 'more moist, and therefore, better adapted to receive the 'plants in winter than in spring; and the buds being then 'undeveloped, there is no risk of breaking off the shoots, 'which is the case if the planting is postponed until spring.

"*Cultivation.*—On lands where ploughs can be used, as 'soon as the grass begins to appear in the spring, they are 'run within a few inches of the lines of the plants, throwing 'the earth from them: and in a day or two they return and 'throw it back again. The top of the small bed is then hoed 'or hand-picked free of grass: if the shoots are well up, the 'former operation is preferred—if but partially, the latter. 'The operation of ploughing is repeated in a fortnight, or 'less, and is done in the same way, except that the furrows are 'somewhat farther from the plants. The tops of the beds 'are again hoed, and the earth thrown up by the plough, 'is dressed when required. When the cane is mid thigh 'high, the plants are earthed up to by the plough, giving an 'additional bed of two inches high. This is done by passing 'the plough twice on each side. The plough then passes 'down the centre, between the rows, to form a water chan- 'nel. As we employ oxen principally for our ploughs, the 'use of that instrument is then discontinued; and the next 'and fifth hoeings, if required, are given by the hoe, haul- 'ing up the earth to the plants at each operation. When 'the plough cannot be used, the work is performed by 'the hoe, but less effectually. The sooner the cultivation 'of the plant is discontinued, after it has arrived to the 'height of three and a half to four feet, the better, as earlier

'maturity is ensured by it. This is usually from the 10th to 'the 20th of June. The crop requires no further attention 'until the middle of October, when it becomes necessary to 'sow seed for the next crop.

"*Saving of Seed.*—Small, short jointed canes, are the 'best for seed, as they have a greater number of buds to 'the same length of cane, than those which are larger; and 'there is economy, as they are less valuable for grinding.

"Convenience of situation to facilitate the transporta- 'tion of the fields to be planted, should be considered. The 'quantity to be reserved for seed, varies from one-third to 'one-sixth of the land to be planted.

"The canes after being cut, are allowed to remain un- 'covered from two to three days, in order to wilt the leaves: 'they are then placed flat in the alleys between the beds, 'with the butts under, and the leaves above, so that the 'latter may form a thatch over the plants, and the whole 'covered with three or four inches of earth, forming a con- 'vex bed or ridge. This is a better mode than matrassing, 'as there is less danger from frost and heating. I have fol- 'lowed this plan for several years with perfect success.

"*Harvesting.*—About the 1st of November, the grinding 'commences. One gang strip off the leaves as far up as 'they separate freely from the cane, which is indicated by 'their being dry: a second gang cuts the canes within a 'few inches of the earth, and again as high as the strip- 'ping has extended; as they are cut they are thrown into 'heaps: a third gang tie the canes into buddles of fifteen 'or twenty: and a fourth carry them out to the flats in the 'canals, or the carts on the roads. The canes are then 'transported by flats or carts to the foot of an inclined rail- 'way, and are placed by from four to six girls in cars, 'which being drawn up by machinery, discharge their 'loads at the foot of the mill, and with the attendance of 'one man furnish canes enough to yield twelve hundred 'gallons of juice per hour. Three men are required to 'feed the mill, which, with active attendance, expresses 'twelve hundred gallons per hour. When one set of ket- 'tles only is used, the half of that quantity supplies them, 'and two feeders are sufficient.

"From one hundred pounds of canes, sixty-six pounds 'of juice, and thirty-four pounds of expressed cane are ob- 'tained from the ribbon (red or purple) variety.

"The expressed cane is carted off, and spread two feet 'deep over the cattle pens, to form manure."

RATTOON CANE.

"In stating the mode of planting, no notice has been 'taken of rattoon. After three years experience, I am 'about abandoning the attempt of rattooning. On some 'fields of a warm and open soil, it has proved a regular and 'profitable crop: but when the soil is cold and stiff, it gene-'rally fails. The experiments which I have had made on 'light hammock lands have not resulted more favourably.

"The mode of treating this crop is, about the 20th of 'February, after burning off the trash and tops, plough 'with sharp coulters are run as near to the old roots as 'possible, without cutting the buds, throwing the earth from 'them. In a week they return and throw the earth back 'again. The subsequent culture is the same as for plant-'ed canes.

"I have also said nothing of removing the earth from 'above the canes to within half an inch of the plants, about 'the 20th of February, as is practised in Louisiana; as the 'system of shallow planting, which we pursue renders it 'unnecessary: and as the sprouts are more or less break-'ing through the ground at that time, the hoe is apt to cut 'them off. When the covering is three inches deep, it is 'very necessary to resort to it.

"It must be distinctly remembered that when the cover-'ing is light, it must be carefully done: and that it is very 'important that the canes should be in close contact with 'the moist soil, otherwise the dry rot will occur.

"Too much stress cannot be laid on the importance of 'deep and thorough draining and fine tilth. The cane 'plant requires *moisture*, but *stagnant* water is fatal to it.

"I have omitted to say that we flow the cane fields for 'one or two tides, during the spring and summer, whenever 'the lands become dry. They are kept as dry as possible 'during the months of August, September, October, No-'vember and December."

The following is the product of two fields, in 1831 and 1832.

"*Crop* 1831—Product from a field of fifty-five acres, 'first year in cane—soil strong alluvial, well drained, and 'in fine tilth.

"161,410 gallons of juice of 7° Baumé.
" 13,240 gallons of syrup, sugar proof.
" Average 3180 gallons of juice per acre.
" 254 gallons of syrup, sugar proof, equal to 1956 pounds of sugar, and 90 gallons of molasses, per acre.
" Average number of canes about 20,500, from four to six feet of *grinding* cane.
" *Crop* 1832 — *Production of a field cleared in* 1831— '*strong tide land*, 30 *acres* well drained by leading ditches, 'eight by four, and cross drains, two feet by two, fifty-two 'and a half feet apart; rough, with logs, &c.
" 3050 gallons of juice, from 6½° to 7°, per acre.
" 318 gallons of syrup, molasses proof, (38° cold of 'Baumé.)
'The canes from the field, rank and succulent, and unfit 'to make good sugar, therefore boiled off into syrup."

We will now proceed to give a brief sketch of the arrangement of the sugar works, referring our readers to the 4th vol. of this journal, (p. 225) for a more minute account and description of them.

The whole are comprised in one long building, divided off into separate rooms. It is constructed entirely of tabby, and of the following dimensions—extreme length, 240 feet —the width throughout is the same, being 39 feet. The height of the engine, mill, and boiling rooms, is 26 feet from the foundation of the walls to the top of the joists; of the curing and cooling rooms, 16 feet. The length of the engine room is 10 feet, and it is divided from the mill-room, which is 20½ feet long, by a partition wall 2 feet thick, rising as high as the shaft of the rollers. The upper part of the machine can therefore be seen by one standing in the mill-room. The engine boiler is placed in a small wing on the outside of the building. The waste hot water runs into a cistern, and by pipes is conducted to the receivers for filling and cleansing them and the kettles when required. The height of the engine chimney is 50 feet. The steam-engine is on the low pressure principle, and of 14 horse power. This is greater than needed for grinding cane. It was, however, intended to be, and is now used also for threshing and pounding rice, when not employed in grinding cane.

The sugar-mill is of the horizontal triangular form, consisting of three equal rollers, 60 inches long and 28 inches diameter, revolving five times per minute, and expressing, with active feeding, from 1000 to 1200 gallons of juice per hour. The foundation upon which the mill rests is of tabby, capped by a frame of timber, and is so braced by abutments and wings, as to be perfectly firm. It is considerably higher than the boiling-room, which adjoins, and to which you descend by a flight of steps.

The *boiling-room* is 60 feet long, and contains two ranges of kettles with their respective receivers and clarifiers, entirely independent of each other. One range is only used at a time, the other remains idle, unless the one worked requires to be cleansed or repaired. In each range there are five kettles independent of the clarifier, and are of the following capacities, viz. 80, 122, 188, 263 and 353. The receivers contain 500 gallons, and the clarifiers 480 each, but are usually charged with 400 only. A trough is placed along the edge of the brick-work to receive the scums and washings of the kettles, and communicates with the scum-tub on the outside of the building.

The *cooling-room* is 60 feet long, and the *curing-room* 98 feet. In the cooling-room are 12 coolers.

"From the teach the syrup is ladled by a spout and 'troughs into the coolers. The troughs are furnished with 'straining seives of wire and with branches and gates to 'direct the syrup to the different coolers, at pleasure.

"The twelve coolers are made of two-inch cypress planks, 'tongued, grooved and rabbetted together, and level outwards on every side: the interior size at the bottom is 7 'feet by 4 feet, at the top 8½ feet by 5½ feet, and the perpendicular height is 14 inches. The level is intended to 'give a diminished depth of syrup to each additional skip, 'in order to preserve an uniformity of temperature: and the 'size of the coolers is so adapted to the capacity of the teach 'that each skip, or discharge of the syrup from the teach to 'the cooler, goes on diminishing from 2 inches, the depth 'to the first, to about 1½ inches that of the sixth. The floor 'of tabby on which the coolers are placed, is slightly depressed under them from the edges to the centre; forming 'two slightly inclined planes meeting at the middle in a 'small gutter from 1 to 4 inches lower than the bottoms of

'the coolers. There is a descent in the gutter, from the 'end next to the teach, to that farthest from it, and at the 'latter a trough is attached which leads to the molasses cis-'tern. The inclined planes being plastered with Roman 'cement, and the spaces between the coolers covered with 'platforms of boards, the leakage of syrup is carried, with-'out any loss or admixture of dirt, to the molasses cistern; 'while at the same time the bottoms of the coolers are kept 'warm by the exclusion of the air.

"The granulated syrup is taken up in buckets from the 'coolers; and the buckets, placed in a car which runs on 'wooden rails, are carried opposite to the hogshead in the 'curing room, in which they are to be emptied.

"The sugar hogsheads stand on joists resting on a cen-'tre wall, and the projecting ledges of the walls of the room. 'The joist are 3 inches wide, 12 inches deep, and 18 inches 'apart: under them, on each side of the centre wall, are 'two floors of tongued and grooved boards, sloping at an-'gle of 18 degrees to a gutter, 6 inches wide and deep, in 'the centre between them, which leads to the molasses cis-'tern. The molasses dripping from the sugar hogsheads 'is received on these floors, and thence runs to the cistern.

"The two molasses cisterns, contains each 7,000 gal-'lons, and are constructed of tabby, plastered with Roman 'cement: the walls are 18 inches thick and 5 feet high, and 'the floors are 6 inches deep, they are sunk 4 feet below 'the surface of the ground, and are covered with tongued 'grooved boards, to exclude rats and dust. A platform of 'boards, 5 feet wide, runs the whole length of the curing-'room, and at each end terminates in a door 8 feet wide; 'a similar platform at right angles to the first leads to ano-'ther door of the same size, in the side of the room next to 'the canal. The hogsheads for molasses are placed upon 'the latter platform, filled by pumps from the cisterns, and 'rolled down the gangway, to the edge of the canal.

"This curing room is calculated to contain 350 hogs-'heads of sugar of 1000 lbs.

"The line of the floor is the same in the boiling and 'cooling rooms, and only six inches higher in the curing-'room: in the first it is 3 feet below the top of the brick of 'the kettles. A flight of steps from the boiling-room leads 'up to the mill, and another below affords a passage out of 'the building by two doors under the large mill-doors.

"The position and sizes of the doors and windows will 'be best understood by a reference to the plates:* and it will 'only be necessary to observe that the doors connecting the 'boiling, cooling and curing-rooms, are made 8 feet wide, 'to admit of the passage of the kettles.

"The ventilation of the steam, in the boiling-room, is 'effected by ten sashed windows of eighteen lights of 8 by '10 glass, which move up and down—ten large semi-circu-'lar windows furnished with Venetian blinds, and two lines 'of openings in the roof, extending over the boiling-mill 'and engine-rooms, 14 inches deep, and closed at pleasure 'by shutters suspended from above by hinges on the prin-'ciple of the windows of a blacksmith's shop."

Having described the building, we will now proceed with the manufacture of the canes, before which, we must, however, notice an excellent arrangement for taking the canes from the flats, on the canals, (which runs but a short distance from the building) carrying them up and depositing them at the foot of the mill.

"The canes are brought by flats to the foot of the inclin-'ed plane, whence they are transferred to cars, which are 'dragged up the plane by a rope winding around a drum. 'On the same shaft with the drum is a band-wheel, con-'nected with another wheel, on the mill-shaft, by a band of 'leather so slack that unless pressed upon by a tightening 'pulley it slides freely around the wheels and gives no mo-'tion to them. The tightening pulley, moves freely up 'and down in a frame, and is connected with a rope passing 'over rollers with the upper end of a lever. When this 'lever hangs in a perpendicular position, the tightening 'pulley presses with its whole weight on the band, and set-'ting the drum in motion, winds up the rope to which the 'car is attached; when the full car has arrived at the ter-'mination of the inclined plane at the mill door, and the front 'wheels have passed the highest point and are descending 'on the opposite side, the lower end of the lever is carried 'forward by the car, and raising the tightening pulley, 'throws this machinery out of geer, and arrests the car at the 'moment when it has shot out its load of canes on the table.

"As the upper end of the lever is carried forward, it is 'prevented, after passing so far, as to withdraw the pressure 'of the tightening pulley from the band, from returning by

* See So. Agr. vol. iv. p. 231.

'a catch; and the machinery remains out of geer. An at-
'tendant pushing the car by a slight effort, beyond the
'turning point, allows it to run down the plane by its own
'weight, until it arrives at the foot, when the rope is trans-
'ferred to another car which has been loaded during the
'journey of the first. At a signal the catch is raised; the
'lever returns to its original position, and the tightening
'pulley pressing in the driving band, the drum is set in
'motion, and the car is carried up to the mill.

"The mill-feeder take the canes from the table, and plac-
'ing them on an inclined board, which projects so far for-
'ward as to prevent their hands being within reach of the
'rollers, shove them regularly forward. The expressed
'canes, after passing between the second and third rollers,
'slide down the trough, on the side of the mill opposite to
'that at which it is fed, and are carried off to a convenient
'distance from the building, by cars running on wooden
'rails."

MANUFACTURE.

"From the mill the juice runs into copper receivers,
'which, with a clarifier, are heated by a fire independent
'of that of the teach-fumaa. As soon as the bottom of the
'receiver is covered to the depth of a few inches, the fire is
'directed under it; and lime is added in small portions at a
'time; in proportion to the quantity of juice, two-thirds of
'the lime is applied to the juice in the receivers.

"From the receivers the juice is drawn by cocks into the
'clarifier, in which it is heated to 210°. The fire is then
'extinguished and the impurities carefully scummed off.
'When clean the remaining one-third of the dose of lime is
'added. The juice is then transferred to the largest of five
'hemispherical kettles which form the teach-fumaa, and being
'carefully scummed, is successively transferred from one to
'the other, until it arrives in the last or teach kettle. Here
'it is concentrated to the consistency required to produce
'sugar. This point is ascertained in three ways—1st, by
'taking a drop of the syrup between the finger and thumb,
'and on separating them after allowing a few seconds for
'cooling, if it draws out into a thread which breaks at be-
'tween one and two inches, while the greater part mounts
'quickly to the finger, the syrup is of the proper consisten-
'cy. 2d, by observing the appearance of the syrup on the

'back of a bright copper ladle. When sufficiently boiled, 'a number of very minute *bubbles* appear on the *surface* of 'the syrup, and *in it* a number of small *black specks or* '*grains.* These at first disappear rapidly, but as the syrup 'grows thicker they increase in quantity and are longer in 'disappearing. When, on dipping the ladle into the syrup, 'and suddenly withdrawing, it then bubbles, and specks 'are thick, and remain from half to one second before they 'disappear, the syrup is sufficiently boiled. Experience 'gives great certaintly in the application of this test, which 'is that most relied on by the negro boilers. 3d, the ther- 'mometer. This instrument is very useful, particularly at 'night, when the second or ladle proof cannot be so well 'used. It is, however, deceptive, unless it be applied some 'time before the syrup is sufficiently boiled; unless it be 'immersed to the same depth; and the syrup be kept in 'active ebulition. With these precautions, it is the most 'exact and scientific test. The degree to which the syrup 'should be boiled depends mainly on the quality of the 'juice, and varies from 228° Fah. to 236°—from 230° to '232°, forms a safe mean.

"With rich and prime juice, good sugar may be made 'from either of these extremes, (228° to 236°.)—The first 'gives less sugar but of a light colour, it drains better, the 'latter more sugar but darker in colour, and retaining more 'molasses. Inferior juice does not bear high boiling, as it 'burns before it arrives at that temperature; such can rare- 'ly be boiled higher than 233°.

"The quantity of lime applied (freshly burned, and 'slacked and sifted every day) varies from 8 to 2 ounces 'per 100 gallons of juice—agreeably to the qualities of the 'juice, more being required as the juice is weak. The hy- 'drometer does not certainly indicate the true character of 'the juice, as its specific gravity may be owing to the im- 'purities as well to the saccharine matter of it; it is, there- 'fore, to be used only as a general guide at 7°, from 6 to 8 'ounces may be applied, at 8°, from 3 to 6 ounces, at 9° 'from 2 to 4 ounces of lime to the 100 gallons of juice. I 'have used from 2 to 3 ounces of carbonate of soda (appli- 'ed to the flambeau or next kettle to the teach) in addition 'to the lime with manifest advantange, both to colour and 'clearness. No more lime should be applied than is suffi- 'cient to coagulate the impurities; as any quantity beyond

'what is necessary to neutralize the acid, and combine with 'the impurities, and render them insoluble, tends to injure 'the colour of the sugar, to combine with a portion of the 'saccharine matter, and to render the impurities less buoy-'ant, and therefore more difficult to be removed by scum-'ming. The indication of a correct dose of lime, is when 'after removing the heavy scums which first arise in the 'clarifier kettle, and adding the last portion of lime, the 'juice examined in a wine glass, is of a bright, clear, *light* '*amber* colour, with the impurities still remaining floating 'about distinctly separated from the juice. If the dose of 'lime has been too small, the juice will be of an opaque, 'milky appearance: if too great, although bright and clear, 'it will be of a *sulphur yellow* deepening into brown, as the 'boiling advances.

"When sufficiently concentrated, the syrup is ladled, (or 'skipped) into cypress coolers, of such dimensions that the 'first skip (usually of 36 gallons) fills them to the depth of 'two inches. As the sides slope at angles of 45°, each 'successive skip occupies a lesser depth. These coolers 'are 14 inches deep, and contain, when full, about 300 gal-'lons. Two successive skips are placed in each cooler; 'and as soon as that quantity is partially grained, other 'skips are successively added until they are filled. If the 'juice is very strong two coolers are sufficient to operate 'on, if it be weak, then three, four, or even six are re-'quired. The rule being not to add a new skip, after the 'two first, until partial granulation takes place. After 'each skip, the syrup of that skip is mixed together by a 'wooden board attached to a handle like a rake. The ob-'ject of this operation is to mix the first portion discharged 'from the teach with the last, to produce a uniform consis-'tency, as the last is more boiled than the first. As often 'as a crust of crystals forms on the surface, (like newly form-'ed ice) it should be broken by a wooden paddle, by a quick 'superficial blow. When the sugar in the coolers has gra-'nulated, and the temperature of the mass is reduced to a 'blood heat, it is removed in buckets and placed in hogs-'heads, containing about 1200 lbs. each. Four holes, of $\frac{3}{4}$ 'inch diameter, are bored at equal distances through the 'bottom heading, and in them are inserted four canes, or 'what is better, a small bundle of large bull-rushes. As 'soon as the mass in the hogsheads becomes firm, the canes

'or rushes are partially drawn, to admit of the escape of the 'molasses. In twenty-four hours they may generally be 'entirely removed: this must, however, not be done before 'the sugar is so firm as to prevent the caving in of the tubes 'left by the canes, &c.

"When sufficiently drained the top crust of sugar, what-'ever impurities may be in the syrup is removed, the hogs-'head filled up and headed for market. Except the sugar 'is very bad, it will be fit for market in three or four months. 'The finer qualities in from four to six weeks.

"Hogsheads are usually employed for draining, but shal-'lower vessels are preferable. The drainers recommended 'by Porter, with inclined planes at the bottom, answer re-'markably well. Half hogsheads are better than whole 'ones; indeed the shallower the better, as the inferior strata 'of sugar become clogged by the impurities from the upper 'passing through them. It is advantageous to have the 'cooling-room very airy, and the curing-room warm and 'dry.

"The molasses from the sugar is collected in two cis-'terns of tabby, lined with Roman cement, and *rat proof*, 'containing each 7000 gallons; from these it is pumped 'up and carried by a hose into the hogsheads."

SUGAR OPERATIONS—ARRANGEMENT OF WORK.

"The grinding and boiling continues from Monday 'morning to Saturday night. To enable the hands to un-'dergo the work, they are divided into three watches, one-'third going out at each watch of 8 hours, so that each per-'son works 16 and sleeps 8 hours in the 24. The mill 'feeders are changed every 6 hours, as their work is more 'severe.

"To continue this incipient work, the following hands 'are required to boil off 10,000 to 14,000 gallons of juice 'per 24 hours.

Car Feeders,	12 girls rating from ¼ to ¾ hands	6 at a time.
Car Tender,	2 men.....1	do.
Mill feeders,	4 men (for one set of kettles) ..2	do.
Boilers.	10 men and boys, ...7	do.
Potters,	3 boys, ...2	do.
Washers,	2 women or girls, ...1	do.
Firemen,	5 men (including engine) 3	do.
Trash Carts,	4 boys, ...2	do.
Engineers,	2 negro men, ...1	do.
Scum Boilers,	1 woman and a girl, ...1	do.
	46 persons.	26 at work at the same time.

The following extract from the sugar-house book will give some idea of the sugar operations on this place.

"*Performance in* 1831—Greatest quantity of juice boiled 'off in 24 hours, say one set of kettles, was 14,000 gallons. 'Average during the season 10,000 gallons.

"Number of skips of 34 to 36 gallons of syrup, sugar 'proof, 30 to 37, in 24 hours.

"*During the year* 1831, the result was—

"369,730 gallons of juice boiled off.

" 33,815 gallons of syrup, sugar proof (44° cold of Baumé's hydrometer.)

" 1,002 skips, equal to 6,667 lbs. of sugar, and 309 'gallons of molasses per day.

"The juice varied in strength from 7° to 8½°.

"10 $\frac{93}{100}$ gallons of juice were required to make one of 'syrup, sugar proof."

SCUMS.

"The proportion of juice removed in scumming, is from '5 to 10 per cent. This is generally used only for hogs 'and cattle.

"We have adopted the plan of filtering the scums, and 're-boiling the juice into plantation molasses; and make on 'an average, each day, about 30 gallons, being 3½ per cent. 'on the juice expressed, or a saving of one-half of the scums. 'The refuse is more than can be consumed by the stock. 'The quantity of molasses made from the scums, will this 'year exceed 1000 gallons."

We conclude this part of our account by some general remarks of Mr. Couper's, on the *Cane crop*.

"It is believed that the cane can be cultivated profitably 'on the sea-board of Georgia, in rich lands, which can be 'well drained. To insure success, such an apparatus must 'be procured, and such facilities for harvesting provided as to 'take off the crop between the 1st of November and 15th 'of December. It will be unsafe to calculate on a longer 'grinding season. To enable the planter to accomplish this, 'he should not plant more than half his crop in cane. This 'will enable him to apply a double force to the harvesting 'of the cane crop—prevent his land being exhausted by the 'continual recurrence of the same crop, and facilitate all 'his operations during the year.

"Under the circumstances above mentioned, it is believed that the cane crop will, on an average of several years, be more profitable than either cotton or rice: but enormous profits are not to be expected from it in this climate. Its chief value is in offering to our agriculture a third plant, yielding a rich return, to be combined with rice and cotton; thus extending the system of rotation another year.

"The cane plant being in a great measure exempt from the fatal effects of fall gales, gives a very desirable security to the planter against a total loss of crops, should they occur.

"The labour of grinding a cane crop has been frequently represented as injurious to the negroes. The reverse has been the case here. During that period the hands are cheerful, and at its termination they have improved in general appearance. At no period of the year is there so little sickness, or disposition to avoid work.

"The investment of capital in machinery is not greater for cane than for rice, when the latter is pounded on the plantation: it is, however, far greater than for cotton. And this circumstance should operate against any attempt to enter into the cultivation of the cane, except in a scale of 100 to 200 acres, and under the advantages of rich soil and efficient drainage. If undertaken on a small scale with inefficient machinery, and without adequate preparation for transportation, failure may be expected as the certain result accompanied by a great waste and expenditure of labour.

"Whether the cane can be profitably cultivated in Carolina, is to my mind very problematical. I incline to the opinion that as a *sugar* crop it cannot. But I believe that on well drained inland-swamps, it will be found to be valuable if manufactured into syrup. The seasons of South-Carolina should give sufficient maturity for that purpose. And strong inland-swamps should yield from 150 to 300 gallons of syrup per acre.

"The most valuable return that we have received from the cane has, during two years, been from new lands which produced plants of such a succulent character, that the juice could only be manufactured into syrup. In each instance the value per acre was $90.

(To be concluded in our next.)

ART. LXXV.—*On the Advantages and Disadvantages of locating a Planting Interest in the Southwestern Prairies; by* A PLANTER.

(Continued from page 471.)

Dear Sir,—In my last communication, I tried to point out as correctly as my opportunities and observation enabled me, the advantages and disadvantages of locating a planting interest in such of the Prairies of the West, as I had seen. I shall now attempt some account of the other lands there, and give a few hints as to the first steps that should be taken by a new settler.

The other lands are classed by planters into the red and grey uplands, and the river lands. The river lands are generally strips of alluvial soil immediately on its margin, rather narrow but very rich, called the first low grounds; the second low grounds are much wider but not so rich; and there are large quantities of lands in the "bends," of which there are a great many from the crookedness of the river. These "bends" or "necks" often in the shape of a horse shoe, present generally, on their upper sides, high bluffs of red land, not overflowed by the river, except from very extraordinary freshets, such as the Yazoo freshet of 1796, and the freshest of this spring; and on their lower sides, lands frequently overflowed, but richer on that account. The river lands are generally light isinglass sands that work freely with both plough and hoe, and produce more cotton for equal fertility than corn, and more cotton, and perhaps more corn than the Prairie, and are more free from its little discomforts. These lands, though at this time more healthy than ours, may be considered as sickly, and are liable to inundation, with its disadvantages of injury to your stock, and the removal of your fences, &c.

The freshets in the Alabama river, though not as regular in their periodical returns as in the Mississippi, are generally up in the latter part of the winter and spring, and but rarely, indeed, during the crop-making season. I am informed there has been but one summer freshet to injure a crop within the last fifteen years, it is much to be doubted whether this will continue to be the case, when the country above becomes more cleared and drained. The freshets on this river for fifty miles below where it receives the waters of the Coosa and the Talapoosa rise to sixty-five feet

and more above ordinary low-water mark; and then do not cover the high bluff lands. The great convenience of having good navigation at your door for the most bulky articles, with the expedition and facilities offered by the steam-boats, which pass up and down the river on almost every day during the winter and spring, place these lands deservedly very high.

The red and grey uplands lay very level and do not wash, are easy to work and free from the casualties of the river, and the disagreeableness of a residence on the Prairie, and make the handsomest plantations. They do not produce as much per acre as the swamp or the Prairie, and they suffer more from drought, and I think they are not as durable; but their conveniences are so great, and you are sure of a pretty good crop, and your lands lay together so handsomely that they also stand very high, and I think are more in request than any other lands by the residents. They are more healthy than the river lands, but less so than the Prairie. The grey lands are lighter and bear drought better, but are not generally as productive. To contrast these lands with each other, I should say the red lands make the handsomest plantations, and the most comfortable residences, and are liable to the fewest casualties and diseases, but their general crops not as large as either of the others. The river-lands have the most substantial conveniences, make large crops, and have a great advantage in the navigation, but are less healthy than the others. The Prairies make the largest crops and have most health, but make very unpleasant residences and bad roads, and are liable to the rust, a disease uncertain in the extent of its injury, or to what kinds of Prairie it may extend.

With these advantages and disadvantages before him of the different kinds of land, a settler will try so to locate his plantation as to avoid the prominent objection to each. If you select a river or a red-land plantation, the same rules that would guide you in what lands you would plant if here, ought to guide you there, I shall, therefore, say nothing about them. If a Prairie plantation is selected, and I could recommend one settled at double the price of one all in the woods as cheaper. I would advise, that the bald Prairie part of the old land should be put in corn, because it rusts the cotton, and the wood-land, both old and new, and the bald, if new, to be put in cotton, because the bald

is very little liable to rust cotton till it has been planted three years. The only difficulty of making a crop on the bald Prairie the first year is, that the land is so much bound in a close mat of coarse grass roots, that it cannot produce, without it is ploughed up sufficiently early for the frosts of winter to strike through it and moulder it down. One of our broom-straw old fields will give you some idea of a bald Prairie, both as to the appearance of its growth and the situation of the soil as affected by its roots. Newly cleared land gives a more certain rise of cotton and a surer crop than old land, and requires for its preparation the same treatment from hoe and plough as here. The general preparation for the crop should be as it is here among good planters: though it is certainly true that fine crops are made under a preparation of the soil, and a cultivation of them entirely too slovenly to be called husbandry, or to give the planter any credit for it, as it all belongs to the soil and the season.

It is an object of first consequence to clear land for cultivation, therefore, after fixing your negroes in comfortable buildings, and a good pen for your mules, you should push your clearings, and put your plantation under one fence. The most expeditious mode of clearing, is to grub nothing, but to cut with the axe the bushes even with the ground, and to cut down the small growth under four or five inches in diameter, and all the rest to girdle or ring by cutting through the bark and a little into the sap-wood all round the tree, and to do so little of the cutting down as to enable each labourer to go over from one-third to one-half acre per day. Where the stump of the tree stands, you cannot plant, and the body may as well stand above it, for at any rate the first and second years. Another kind of girdling is to cut in with the axe in single chops, following each other in the circle, without taking the chip out; this mode is about four times as fast as the other, and yet, perhaps, not to be preferred, because as you have no present means of knowing whether the communication of the sap has been cut off, you are very liable to be imposed upon with bad work. Where you wish to make certain of the trees dying the same year, you must girdle deep enough to go through the sap-wood. I have seen large oaks in the spring and autumn wilt on the same day they were girdled deep, that is into the red wood. The trees easiest killed are the ash,

the maple, the pine, the various kinds of oak and the cotton; the trees most difficult are the sycamore, the gums, the beach, the elm, the wawhoo, and the lyn. You will of course pile your brush and burn about such trees, and leave the others to the stroke of the axe. Where the undergrowth is principally cane, and a thick growth of it, you cut down and girdle nothing, but cut down the cane, which when seasoned, you put the fire to and it does all the rest of the cleaning for you; but the cane must be close so as to make a strong fire. Where it is sparse, you will have to clear as above described. When you are clearing have all the stuff suitable for your buildings cut and hauled to the spots on which they are to be erected, because after the crop is laid by, you cannot haul out of the cultivated fields, and your teams will not be in a suitable condition after making a crop. In ordinary years you may calculate on taking off a large portion of your men from the middle of June till the middle of August or first of September, to go to work on your buildings; you should have a strong team of oxen.

I believe I have given you a faithful account of the lands and the various matters that are to be taken into consideration, in making choice of a plantation, with some of the steps preparatory to commencing a crop. The best mode of attending a crop, and the quantity that may be attended to the hand, are matters I do not feel competent to advise upon, and would therefore recommend the practice of the best planters of your neighbourhood. The usual mode of cultivation is different from ours, and possesses much advantage over it in its greater expedition—they neither bed nor draw earth to the cotton with the hoe, their almost exclusive object is to draw the grass and weeds from the plant, and leave the rest to the exertions of the fine soil. The broad skim plough is very much used.

The want of room on my paper admonishes me it is time to conclude this long letter. It contains so little matter of general interest to your readers, that I send it with hesitation, assuring you it is entirely at your discretion, either to put it in your columns, or into the fire.

Your's, &c.

A PLANTER.

July 20, 1833.

ART. LXXVI.—*Gama Grass—A probable botanical error respecting this grass corrected; by* N. HERBEMONT.

"Columbia, (S. C.) August 5, 1833.

Dear Sir,—In the number of the *Baltimore American Farmer* of the 26th ult. page 157, I noticed an article taken from the *Newbern Spectator*, signed "H. B. C." on the subject of the Gama-grass, *(Tripsacum monostachyon.)*—This gentleman says, "And to this conclusion," (that all the different species of this genus were cultivated for provender,) "I have been led by my subsequent inquiries of those 'who have cultivated the grass. For one gentleman as-'sures me that the grass which he cultivates as the Gama-'grass has the spikes aggregated, and is therefore, the *Trip-'sacum dactyloides;* another that the spikes of his grass 'are cylindrical and solitary, and is therefore the *Tripsa-'cum monostachyon*, if indeed it be not the *Tripsacum cy-'lindricum* of *Michaux.*" This led me to suspect that there might be some error in the original description and denomination of the plant; and to ascertain this as much as I am able, I examined my Gama-grass, in a state of cultivation, more particularly than I had ever done, and compared it with the descriptions of various botanists. This satisfied me of the probability, at least, that the *Tripsacum dactyloides* and the *Tripsacum monostachyon are the same grass*, and that Michaux and the other botanists who have described it have probably been led into an error by the circumstance that will be noticed here below. My grass, the seed of which was given to me in the spring of 1832, answers the description of both species, viz. some of it has double, others triple spikes, while others, perhaps, the greatest number have single ones. I speak only of the *first terminal spikes.* This might indicate that I have both species; but the stem, whether terminating in a single, double or triple spike, invariably produces none but single ones on the branches. Now, if you examine the plant with several spikes, before the branches have put out, (and the principal or terminal spike generally arrives to and pass its perfection before the branches make their appearance,) it will be found to agree perfectly with the *Tripsacum dactyloides;* but if the plant be examined later, the spikes at the termination of the branches, which are all single and

cylindrical, they will be found to agree perfectly with the description of the *Tripsacum monostachyon*. Some of the plants, particularly the less vigorous ones, have the principal or first terminal spike, single or cylindrical. It appears to me extremely probable that Michaux and others, have only examined this plant rather too early, and by seeing in one locality, plants bearing several spikes at the summit, and in another, perhaps, less fertile spot, single cylindrical ones have very naturally taken them for distinct species. I may here observe that before the branches with their single spikes make their appearance, the principal or terminal one has already lost all its sexual characters; so that in this state the plant cannot be subject to correct examination. I also observe that stalks with single spikes at the summit, and others with double or triple ones are *produced from the same root.* I have not seen the other species of this genus, the *Tripsacum cylindricum* and the *Tripsacum hermophroditum.* Pursh seems to have suspected the error; for he says, "the *Tripsacum monostachyon* seems to be but a single spiked variety of the former," the *(Tripsacum dactyloides.)* It is needless here to notice the botanical characters of the plant, which are certainly the same in all I have seen; but I may observe that when it terminates with two spikes, the two, when brought close together, form a cylinder, and so do the three spikes; the last being triangular, and the former semi-cylindrical.

As this plant is not a native of my immediate neighbourhood, I have not seen it in its native state. I divided the small parcel of the seed given to me into two equal parts, one of which was planted in my garden, and the other at my farm; both very dry sandy spots. That at the farm was planted in a row about 400 feet long, a part of which is much poorer than the other, and the poorest part produced a greater proportion of single spikes than the other, or than that in my garden. The number with two spikes is comparatively small, next the three spiked, then the single or cylindrical ones which are rather the most numerous. It must not be forgotten, that I speak here only of the first and terminal spikes; for all the lateral ones are invariably single and cylindrical, and perfectly similar to the others in every other respect.

It is always desirable to have errors in science corrected, and it is particularly so when they relate to an object like-

ly to be so extensively useful as the Gama-grass promises to be. I have thus noticed this evident error to induce abler and better known botanists to look into this matter and make the due correction. It seems to me that, if I am correct in my views of the subject, both specific names, "*dactyloides*," and "*monostachyon*" will have to be given up, and some other given to designate the plant. I am not prepared to propose positively a name; but I will suggest that, if "*Gama*" is, as it seems to be, the name of a Spanish gentleman who first introduced it into cultivation in Mexico or elsewhere, why not commemorate the benefit, by giving it his name as the specific one, particularly as it is that by which it is now more generally known? *Tripsacum Gama*, or *Gamæ*, would then do very well, and it appears to me, very desirable, always to approximate, as much as practicable, the common, to the botanical names.

It is supposed that this grass is rather too coarse and rough. It would, perhaps, be so, if it were kept till it is too old before it is cut for fodder. As I intend to save all the seed of it in my power, in order to plant as much of it as I can, I reserved only a small portion of the grass for cutting, and it was cut for the fourth time this season, on the 27th ult. It might have been cut at least once more, if I had begun earlier as I should have done; and I expect to cut it at least three times more. I wish I may find it practicable to send you, Sir, a specimen of the hay, as also specimens of the stalks with their various spikes for botanical examination. The hay, I have no doubt, would be found excellent. As to the amount of produce, it is probable that the account I have seen, stating that it would be about 300,000 lbs. of green grass of the various cuttings of one season, per acre, the person that made the supposition may have been rather too sanguine; but there cannot be any doubts of its being the most productive and easily cultivated grass ever tried in this country.

I am, very respectfully, dear Sir, your obed't. serv't.

N. HERBEMONT.

ART. LXXVII.—*Gama Grass—its culture recommended—with some remarks upon the genus Tripsacum, and its species; by* H. B. CROOM.

"Newbern, August 25, 1833.

Mr. Editor,—The grass which passes under this popular name, and which is known to botatists under the names of *Tripsacum dactyloides*, and *Tripsacum monostachyon*, has acquired a considerable degree of celebrity, and promises to become of much value to the agricultural interests of the Southern States. While the Northern and Western portions of our country are provided with a variety of valuable grasses, suited to their climate and soils, the *alluvial* portions of the Southern States are entirely destitute of these useful auxiliaries: for, I believe, that in these, neither Clover, Timothy, Herd's grass, Orchard grass, nor any of these grasses derived from northern climates have proved, nor ever will prove extensively beneficial. The consequence is that, throughout this extensive portion of country, no hay is made, and the only native product relied on as provender for horses and other cattle, is the dried blades of Indian corn. Hence, the planter's stock is generally stinted during winter, and the products of his *dairy* rendered extremely meagre; and butter, cheese, and even *hay* for horses, are imported from the North into the Southern towns. On the contrary, *Guinea grass*, so much valued in the West-India islands, would probably prove but an *annual plant* in this climate—that is, the roots, as well as the stem and leaves, would die from the effects of frost. The same circumstance destroys the value of our *crab-grass, (Digitaria sanguinalis)* and our *crow-foot grass, (Eleusine indica)* for these are both *annuals*. They perish with the approach of winter, and are renewable only from the seed. Under these circumstances the Gama-grass presents unsual claims to our attention. It is a native of the alluvial soils of the Southern States, grows well in every variety of soil, yields a most abundant crop, and is a *perennial* plant, that is, its roots preserve their vegetative powers through the winter, and the crop is renewed, for several successive years, without the necessity of replanting. The zealous advocates of this grass have assured us that it will yield

from 70 to 90 tons of *green* hay, or from 20 to 30 tons of *cured* hay to the acre. But if there should be any exaggeration in this, we may reduce the estimate *one-half* and the product will still remain ample enough to make its cultivation highly profitable. Ten tons of cured hay is equivalent to twenty-five ordinary stacks of our *fodder*, and thus the product of five acres of Gama-grass would equal 125 stacks of corn-blade-fodder! which is more than is obtained from 300 acres of corn on common soils.

It appears that the attention of the American public was first drawn to this grass by Dr. Hardeman of Missouri, and Mr. Magoffin of Alabama. These gentlemen represent it as wonderfully prolific; and recently W. B. Meares, Esq. an enterprizing and skilful agriculturist of our State, who has undertaken the cultivation of it, confirms, in a great degree, the previous statements of those gentlemen. Mr. Meares has tried it in stiff prime lands, and in loose sandy soil, manured, and found it to grow well in both situations. The seed when planted should be put in drills from 18 inches to 2 feet apart, and hand-hoed once, or oftener if necessary. In the course of the first season they spread and cover the whole surface. During the second year it may be cut once a month, from May to November. I do not know for what number of years the same roots will continue to yield fair crops, but probably from three to four, perhaps more.

The genus *Tripsacum*, to which the Gama-grass belongs, according to Nuttall, is exclusively North-American, and consists of only two species *Tripsacum dactyloides*, and *Tripsacum monostachyon*, indigenous to the Atlantic coast and the Prairies of the Western States, thus rejecting the species mentioned by Michaux, under the name of *Tripsacum cylindricum*, having hermaphrodite flowers, and growing in Florida. I find mentioned, however, in Loudon's "Encyclopædia of Plants," a species under the name of *Tripsacum hermaphroditum*, said to inhabit the West-India islands, and to be used there as *provender*, and it is difficult to resist the conclusion that it is identical with the *Tripscaum cylindricum* of Michaux, having hermaphrodite flowers.

The character of this *genus* are very accurately given in Nuttall's "Genera of North-American Plants," and may be rendered thus: Flowers, *monoicous*, disposed in spikes,

with an articulated or jointed rachis, which are solitary or aggregated; upper flowers masculine or sterile, brought together by pairs; the lower fertile, the exterior valve indurated, closing the excavation in which the seed is imbedded, but perforated by two small holes at the base, and a two-parted apex for the egress of the *two* styles, which are plumose and exserted. The species *Tripsacum dactyloides* is thus described by Elliott: "spikes numerous, (3 to 4) aggregate; florets sterile near the summit, fertile at the base; and in his extended description thus: "Flowers in terminal spikes; spikes three or four, bearing flowers on one (the interior) side. Fertile florets two to four, at the base of the spike, sitting in the excavations of the jointed, scabrous, (?) somewhat triquetrous rachis." This description does not mention the spikes which terminate the *branches* of the stem, and contains some errors. It may be given more correctly thus: "Flowers in terminal spikes; spikes of the *stem* aggregate, two to four, bearing flowers, sometimes alternatively on two sides, sometimes on one (the exterior) side. Fertile plants four to fourteen, at the base of the spike, &c. Spikes of the *branches* solitary, and somewhat cylindrical," (precisely like those of *Tripsacum monostachyon.*) The *aggregate* spikes represent a cylinder cloven into two or more parts, and when brought together recompose a somewhat cylindrical body, like a single spike of *Tripsacum monostachyon.*

The species *Tripsacum monostachyon* appears to differ from the preceding, only in having *all* its spikes *solitary* and nearly cylindrical. Elliott, indeed, represents it as smaller, and its leaves as less scabrous or rough, but these are not very important characters, and may be caused by circumstances. Accordingly *Prush* has suggested that *Tripsacum monostachyon* is but a variety of *Tripsacum dactyloides;* and although Elliott and Nuttall have not recognized the propriety of the suggestion, yet there is strong probability of its truth. Mr. Herbemont, of Columbia, (S. C.) in a recent publication has advanced the opinion that these species *are one*, and grounds it on the following facts. He received some seeds, (all from one source) and planted them, one portion in his garden, and another in his farm, where the soil is not so rich as in his garden. On examining the plants he found some with solitary spikes, and some with aggregated spikes terminating the *stem*,

while those of the *branches* were solitary. At the farm, the proportion of single spikes was greater than in the garden; and again, the proportion at the farm varied with the quality of the soil! Thus, apparently, establishing the fact that one of these species, (as they have been supposed) *runs into the other;* and that, therefore, they are not distinct species. Mr. Herbemont proposes, therefore, to abolish both of these specific names, and to substitute a third, suggesting for that purpose, *Tripsacum Gama*, in honour of the Spanish gentleman who is said to have introduced its culture into Mexico. For myself, I have a preference for *characteristic* names, and as we know so little of the person to be commemorated, I would suggest the appropriate name of *Tripsacum heterostachyon*, in allusion to the diversity of its spikes.

This plant appears to possess a surprising adaptation to variety of climate, as well as of soil, growing spontaneously in the Prairies of the West, and along the Atlantic coast from New-England to Florida.* In this State it has been found on the Neuse, near Newbern, by us, and on the Cape Fear River, in the counties of Brunswick, New-Hanover, and Bladen.

It can be propagated by its roots, as well as its seeds.

H. B. CROOM.

N. B.—The writer would like to learn whether the Guinea-grass is annual or perennial at Charleston, and whether its culture is thought profitable.

Note.—It has afforded us great pleasure to insert the communications of Mr. Herbemont of Columbia, and Mr. Croom of Newbern, and we have every reason to believe, that the publication of their investigations on the subject of the *Tripsacum*, or Gama grass, will incite botanists in various portions of our country, to examine and compare specimens, and that this will lead to a more thorough knowledge of the different species and properties of a grass, that promises to be of great value to planters of the South and West. The willingness with which these gentlemen have come forward, under their respective names, to communicate their knowledge of this genus to the public, is creditable to them, and will prove highly beneficial to the country. If they should prove correct in their conjectures, that the various des-

* See Nuttall, Elliott, Eaton.

cribed species of *Tripsacum* are composed of but a single species, the merit of the discovery will be divided between them. It appears that a publication of Mr. Croom in the *Newbern Spectator*, on the subject of the Gama-grass, led to the investigations of Mr. Herbemont, whose description of the plants coincides with the experience of planters in this district; these observations brought forth the sensible communication of Mr. Croom, inserted in this number. We regret, that we cannot add much practical information on this subject; the little, however, that we know, we cheerfully communicate.

Botanists have described four species of *Tripsacum*, all indigenous to America, although one *(the Tripsacum hermaphroditum)* may also be a native of Africa. We regret that we have no access to a Herbareum containing the different species. The characters of these plants are preserved with great difficulty in consequence of their heads dropping off at the slightest touch. In this way we have lost the specimens collected by Dr. M'Bride, labelled as two distinct species under the names of *Tripsacum dactyloides* and *Tripsacum monostachyon*, and we have now no means of ascertaining the points of difference, if any, that existed between them. We are, however, strongly under an impression, that three, at least, of the described species of *Tripsacum*, do exist.

1. *Tripsacum Hermaphroditum.*—This species is described by modern botanists as a native of Jamaica. It is noticed in Linnæus, and in Rees' Cyclopædia. The root is annual, stem from 18 to 24 inches. The *Dactyloides* and *Monostachyon*, besides other marks of difference are 4, 5 and 6 feet in height. A distinguished botanists assures us that he cultivated the *Tripsacum hermaphroditum* three years in a botanic-garden, in Europe, and that it is a very distinct species from the others. It ought to be observed, that he received his seeds from Alexandria, in Egypt, where it was probably cultivated as an exotic.

2. *Tripsacum Cylindricum.*—This species is described by Mich. Wild. and Pursh. It was not seen by Elliott, who suspected it to be a species of Rottboellia, a genus to which it bears a strong resemblance. Mr. Leitner, a botanist, who has recently explored the southern coast of East Florida, under the patronage of several individuals, principally of this city, and who has returned a few days ago, informs us that the *Tripsacum cylindricum* is found growing plentifully at Cape Florida. It is distinguished from the other species, by its having spikelets contiguous, separated by short joints.

3. *Tripsacum Dactyloides.*—4. *Tripsacum Monostachyon.*—These two species may be found to be mere varieties of each other. The specimens sent us by Mr. Herbemont, certainly answer the descriptions of both. We would esteem it a favour if some of the planters on the Ogechee river, where Elliott says he examined the *Tripsacum dactyloides*, would, at the proper season,

send us either the seeds or the dried specimens of the plants. The *Tripsacum monostachyon*, he considers the common species cultivated as the Gama-grass. We agree with Mr. Croom, that these descriptions require a further examination and correction; we would respectfully suggest to botanists in various parts of the country to collect and exchange seeds and specimens of the *Tripsacum* that may be growing in their immediate vicinity; and in the course of a single season, every difficulty in regard to this genus may be cleared up.

The two names proposed by our respected correspondents, are both of them sufficiently appropriate. That of Mr Croom, *(heterostachyon)* is certainly most characteristic, yet we would prefer the former, *(Gamæ)* from the simple fact, that under this name the plant would be more easily recognized by those who have no knowledge of botany. But, however, appropriate these names may be, we would recommend a further investigation before either of them are applied. We have, moreover, a great objection to the multiplication of synonymes. The study of the Sciences, already sufficiently perplexing, has been rendered more laborious by the continued addition of new names to old species. To avoid this growing evil, naturalists of the present day have come to the conclusion, to abide by the specific names of the first describers, and reject all others, although they may be more appropriate. Thus, in the various branches of Zoology, although the genera may be altered, yet the specific names either of Linnæus, or the first describers are retained. We should like to find this rule observed in the present instance. It is conjectured, that one plant is already described under four names as four species, and two other names are now suggested. Should it be ascertained on further investigation, that two or more species of *Tripsacum* should prove to be but one species, then we should in our opinion adopt the name first given, though it might not be quite appropriate, and adopt the other as a synomyme.

The *Tripsacum* or *Gama-grass* grows in various situations, and in considerable quantities in this State. We have collected specimens at Beaufort, on James' and John's Islands, and on the plantation of Mr. Nathaniel Heyward, a few miles from this city, where it grew spontaneously. We also collected it a few years ago on the banks of the Connecticut river—in the neighbourhood of Philadelphia, and within a mile of Newark, New-Jersey, and we are under the impression, that it may be found in nearly every portion of the United States, particularly the maratime districts.

Of its importance in agriculture, we have not sufficient experience to express an opinion.

In answer to the inquiry of our correspondent, whether the *Guinea-grass* is annual in South-Carolina, we have to remark, that it is usually so; we have known the roots preserved in one

or two favourable situations in some of our mildest winters, but in all our efforts, even in a green-house, we have seldom succeeded; and if the Gama-grass is equally nutritive, it must, therefore, be decidedly superior.—*Ed. So. Agr.*

Art. LXXVIII.—*On Rust in Wheat; by* Thomas Parker.

"Rockey Grove, Abbeville District, July 18, 1833.

Dear Sir,—In a late communication to you I gave it as my opinion, that the late wheats sown from the 15th of October to the first week in November, in order to avoid the autumn fly, would not be in much, if any greater danger from the rust, than that sown earlier, if proper precautions were used. I will now give my reasons for that opinion. But before I do this, let me take a view of the disease called the rust, that my subject and views may be better understood and easier explained.

The rust is a disease that attacks wheat the latter end of May, or early in June. The diseased plant becomes spotted all over with a ferrugious powder or fine dust, resembling the rust of iron, and which comes off readily when touched by any thing; the plant assuming a dry appearance and a brownish or rusty colour, very distinguishable from its appearance when arrived at maturity. Its first appearance amongst the wheat, is in one or more spots in a field, from whence it seems to spread on all sides, in some seasons with astonishing rapidity; from which circumstance it is considered by many as contagious, and that they think that if the wheat in those diseased spots was cut down and burnt at the first appearance of the disease, the rest of the field would escape destruction. Its effect is not only to dry up the stalk of the plant, so that it ceases to convey to the grain those juices necessary for its perfection, but it prevents the grain from forming, or causes the grain already formed, to dry up and become quite shrivelled, so as to be good for little or nothing. If a field of wheat is evi-

dently affected by the rust ten days, or a fortnight before it would in common course be fit to harvest, it will generally prove a total loss as to the grain, and the only way to derive any benefit from it as food for stock, is to cut it down immediately whilst it is yet green, and cure it as hay. If attacked later, the grain will be more or less injured in proportion to the progress made by the disease, which is sometimes greater than at others, at the maturity of the plant. The early wheats which ripen in May, such as the Haley, Little White, &c. are seldom affected by the rust, or if so, only to a small degree; but the late wheats, such as the Lawler, Lamus, &c. which ripen in June, are often totally destroyed by it. The rust is to be expected when the season has been very wet; and one of my neighbours says very dry, (though this is not in accordance with my recollections as regards wheat, though it is so as regards cotton,) or when heavy cold dews have prevailed in the spring. It is also said to be a bad sign when the honey dews are copious. The account given of the rust in the edition of *Dean's New-England Farmer*, published in 1822 is, that the disease has been ascertained by discoveries to be occasioned by a minute parisitic fungus, the roots of which intercept the sap, destroy the grain, and unfit the straw for fodder—that the fungus having arrived at maturity, in the spring, on a few shrubs, bushes or plants, its seeds are taken up by the next humid atmosphere, wafted into the adjoining fields, and the nearest wheat is sure to suffer the most from it.

I am now to give my reasons for thinking that late wheat sown from the 15th of October to the first week in November, so as to escape the autumn fly, instead of being sown in August of September, will, from such late sowing, be in no more danger from the rust than that sown earlier, or that this danger may to a great extent be avoided. And in the offset, I will admit all that can be asked of me by those who hold a contrary opinion, which is, that in the maturing of a crop of any of the late wheats, the delay of a week may occasion considerable, if not total loss by the rust. In the first place, then, whilst I admit that the time at which wheat will mature, depends somewhat on the time at which it was sown, yet I think, *that so much does not depend on the time of sowing as on the degree of maturity at which the wheat arrives before the severe cold of the*

winter sets in, (which does not occur before the 20th of December,) *and that only a certain degree of maturity is necessary to be thus obtained to cause the wheat to shoot at the earliest possible period in the spring, which the ntaure of the plant will admit of, which degree of maturity, late wheat sown between the 15th of October and first week in November, can be made to attain.* And in this opinion, I am borne out by the fact, that I have seen wheat sown the first week in November, harvested a day or two before that sown in August; they were probably both equally ripe, but certainly the November-sown wheat was matured as early as the August-sown. (I say from the 15th of October to the first week in November, but the sooner late wheat appears above ground after a killing frost the better, and I have observed in this district, during the last eleven years, that a killing frost has, with but one exception, occurred from the 18th to the 25th of October, and in that winter, I do not know that such a frost could with strictness be said to have occurred at all.) In the next place, I believe, that in those years when wheat is badly affected by rust, late wheat will not, from early sowing, escape it, be that as early as it may, as the rust sometimes commences, before late wheats do, from the nature of the plant, mature the grain. And in this opinion I am also sustained by the fact, that I have seen wheat sown as early as August totally destroyed by the rust, and have not known of an instance where early-sown wheat has escaped, and later-sown been lost *in the same year.* If this has occurred elsewhere, let me ask if the precautions recommended below were observed? From all the information I have been able to obtain on this subject, from my own experience, from reading, and from the information of intelligent and observant agriculturists of this district, I believe, that wheat sown between the periods above mentioned, can be so managed as to be made to ripen as soon as wheat, sown in August or September, in the usual manner, commonly does. I would effect it in this way. I would sow the wheat on as strong land as I had, break up the land with the plough as deeply as possible before sowing it, and harrow in the seed, sow it thicker by one-fourth or one-third than the usual rule for early sowing, and select for it high mulatto or red land, a soil less liable to the rust than any other, or at any rate avoid black or moist soils as

those most subject to it. And "last of all though not least," I am satisfied, from experience, and that dear bought, that early sown wheat runs a much greater risk of destruction from the combined attacks, or the two separate causes of fly and rust, than wheat sown between the middle of October and first week in November, does from rust alone. No preventative has yet been discovered for the rust, and, I believe, the only way to escape serious injury from it when it prevails, is by sowing the earlier varieties. The objection to sowing them is, that the early wheat are frequently destroyed by late frosts in the spring, which the late wheats are not. These are two dangers to which the wheat crop is liable, and sow what kind of wheat the agriculturist may, he runs the risk of loss from one of them. In 1829, a very respectable and successful planter of this district, told me he had for the last ten years sown no other than the Haley wheat, which he always sowed upon strong land at the rate of half a bushel to the acre, and about the 15th of December, and that he had not as yet lost a crop. As to the plan I have heard recommended of sowing early in October, and pasturing the wheat to keep it back, I cannot think well of it. It may have some success on light soils, but on close soils it must surely fail. On such a soil I know o one complete failure in my neighbourhood.

Yours, respectfully,

THOMAS PARKER.

P. S.—For "black frost," in my communication on the Hessian Fly, read *killing frost*, p. 476, line 10.

PART II.

SELECTIONS.

Art. LXVI.—*The Vices, and Disagreeable or Dangerous Habits of the Horse.*

[FROM THE LIBRARY OF USEFUL KNOWLEDGE.]

(Concluded from page 488)

Overreach.—This unpleasant noise, known also by the terms 'clicking,' 'overreach,' &c. arises from the toe of the hind foot knocking against the shoe of the fore foot. In the trot, one fore leg and the opposite hind leg are first lifted from the ground and moved forward, the other fore leg and the opposite hind leg remaining fixed; but, to keep the centre of gravity within the base, and as the stride, or space passed over by these legs, is often greater than the distance between the fore and hind feet, it is necessary that the fore feet should be alternately moved out of the way for the hind feet to descend. Then, as occasionally happens with horses not perfectly broken, and that have not been taught their paces, and especially if they have high hinder quarters and low fore ones, if the fore feet are not raised in time, the hind feet will strike them. The fore foot will generally be caught when it has just begun to be raised, and the toe of the hind foot will meet the middle of the bottom of the fore foot. It is a very disagreeable noise, and not altogether free from danger; for it may so happen that a horse, the action of whose feet generally so much interferes with each other, may advance the hind foot a little more rapidly, or raise the fore one a little more slowly, so that the blow may fall on the heel of the shoe, and loosen or displace it; or the two shoes may be locked together, and the animal may be thrown; or the contusion may be received even higher, and on the tendons of the leg, when considerable swelling and lameness may follow.

If the animal is young, the action of the horse may be materially improved; otherwise nothing can be done, except to keep the toe of the hind foot as short and as round as it can safely be, and the bevil off and round the toe of the shoe, like that which has been worn by a stumbler for a fortnight, and, perhaps, a little to lower the heel of the fore foot.

A blow received on the heel of the fore foot in this manner has not unfrequently, and especially if neglected, been followed by quittor.

Pawing.—Some hot and irritable horses are restless even in the stable, and paw frequently and violently. Their litter is destroyed, the floor of the stable broken up, the shoes worn out, the feet bruised, and the legs sometimes sprained. If this habit does not exist to any great extent, yet the stable never looks well. Shackles are the only remedy, with a chain sufficiently long to enable the horse to shift his posture, or move in his stall; but even these must be taken off at night, otherwise the animal will seldom lie down.

Quidding.—A horse will sometimes partly chew his hay, and suffer it to drop from his mouth. If this does not proceed from irregular teeth, which it will be the business of the veterinary surgeon to rasp down, it will be found to to be connected with sore-throat, and then the horse will exhibit some other syptom of indisposition, and the swallowing of water will be accompanied by a peculiar gulping effort. In this case the disease (catarrh, with sore-throat) must be attacked, and the quidding will cease.

Rolling.—This is a very pleasant and perfectly safe amusement for a horse at grass, but cannot be indulged in the stable without the chance of his being dangerously entangled with the collar rein, and being cast. Yet, although the horse is cast, and bruised, and half-strangled, he will roll again on the following night, and continue to do so as long as he lives. The only remedy is not a very pleasant one to the horse, nor always quite safe; yet it must be had recourse to if the habit of rolling is inveterate. 'The horse,' says Mr. Castley, in the *Veterinarian*, 'should be tied with length enough of coller to lie down, but not to allow of his head resting on the ground; because, in order to roll over, a horse is obliged to place his head quite down upon the ground.'

Shying.—We have briefly treated of the cause of this vice, and observed that while it often is the result of cowardice, or playfulness, or want of work, it is at other times the consequence of a defect of sight. It has been remarked, and we believe very truly, that shying is oftener a vice of half or quarter-bred horses, than of those who have in them more of the genuine racing blood.

In the treatment of shying, it is of great importance to distinguish between that which is the consequence of defective sight, and that which results from fear, or newness of objects, or from mere affectation or skittishness. For the first, the nature of which we have explained, every allowance must be made, and care must be taken that the fear of correction be not associated with the imagined existence of some terrifying object. The severe use of the whip and the spur cannot do good here, and are likely to aggravate the vice tenfold. A word half encouraging

and half scolding, with a gentle pressure of the heel, or a slight touch of the spur, will tell the horse that there was nothing to fear, and will give him confidence in his rider on a future occasion. It should be remembered, however, that although a horse that shies from defective sight may be taught considerable reliance on his rider, he can never have the cause of the habit removed. We may artificially strengthen the human sight, but horse's must be left to itself.

The shying from skittishness or affectation is quite a different affair, and must be conquered: but how? Severity is out of place even here. If he is forced up to the object by dint of correction, the dread of punishment will afterwards be associated with that object, and on the next occasion, his startings will be more frequent and more dangerous. The way to cure him is to go on, turning as little as possible out of the road, giving the animal a harsh word or two, and a gentle touch with the spur, and then taking no more notice of the matter. After a few times, whatever may have been the object which he chose to select as the pretended cause of affright, he will pass it almost without notice.

Under the head of '*breaking in*,' we have described how the colt may be cured of the habit of shying from fear or newness of objects; and if he then be accustomed as much as possible to the objects among which his services will be required, he will not possess this annoying vice when he grows to maturer age.

Mr. John Lawrence, in his last pleasing work on the Horse, says, 'These animals generally fix on some particular shying butt: for example, I recollect having, at different periods, three hacks, all very powerful; the one made choice of a wind-mill for the object or butt, the other a tilted wagon, and the last a pig led in a string. It so happened, however, that I rode the two former when amiss from a violent cold, and they then paid no more attention to either wind-mills or tilted wagons than to any other objects, convincing me that their shying when in health and spirits was pure affectation; an affectation, however, which may be speedily united with obstinacy and vice. Let it be treated with marked displeasure, mingled with gentle, but decided firmness, and the habit will be of short endurance.'*

* 'We will suppose a case, a very common one, an every-day one. A man is riding a young horse on the high-road in the country, and meets a stage-coach. What with the noise, the bustle, the imposing appearance altogether, and the slashing of the coachman's whip, the animal at its approach erects his head and crest, pricks his ears, looks affrighted, and no sooner comes alongside of the machine than he suddenly starts out of the road. His rider, annoyed by this, instantly commences a round of castigation with whip, spur, and curb, in which he persists until the horse, as well as himself, has lost his temper; and then one whips, spurs, and pulls, and the other jumps, plunges, frets, and throws up his head, until both, pretty well ex-

Shying on coming out of the Stable is a habit that can rarely or never can be cured. It proceeds from the remembrance of some ill-usage or hurt which the animal has received in the act of proceeding from the stable, such as striking his head against a low door-way, or entangling the harness. Coercion will but associate greater fear and more determined resistance with the old recollection. Mr. Castley, to whom we are indebted for much that is valuable on the subject of the vices of the horse, gives an interesting anecdote, which tends to prove that while severity will be worse than useless, even kind treatment will not break a confirmed habit. 'I remember a very fine grey mare that had got into this habit, and never could be persuaded to go through a door-way without taking an immense jump. To avoid this, the servants used to back her in and out of the stable; but the mare happening to meet with a severe injury of the spine, was no longer able to back; and then I have seen the poor creature, when brought to the door, endeavouring to balance herself with a staggering motion upon her half-paralyzed hind extremities, as if making preparation and summoning up resolution for great effort; and then, when urged, she would plunge headlong forward with such violence of exertion, as often to loose her feet, and tumble down "altogether most pitiable to be seen." This I merely mention,' he continues, 'as one proof how inveterate the habits of the horses are. They are evils, let it always be remembered, more easy to prevent than cure.'

Slipping the Collar.—This is a trick at which many horses are so clever, that scarcely a night passes without their getting loose. It is a very serious habit, for it enables the horse sometimes to gorge himself with food, to the imminent danger of staggers; or it exposes him, as he wanders about, to be kicked and injured by other horses, while his restlessness will often keep the whole team awake. If the web of the halter, being first accurately fitted to his neck, is suffered to slip only one way, or a strap is attached to the halter and buckled round the neck, but not sufficiently tight to be of serious inconvenience, the power of slipping the collar will be taken away.

hausted by the conflict, grow tranquil again and proceed on their journey, though not for some time afterwards in their former mutual confidence and satisfaction. Should they in their road, or even on a distant day, meet with another coach, what is the consequence? That the horse is not only more alarmed than before; but now, the moment he has started, being conscious of his fault, and expecting chastisement, he jumps about in fearful agitation, making plunges to strike into a gallop, and attempting to runaway. So that by this correction, instead of rendering his horse tranquil during the passage of a coach, the rider adds to the evil of shying that of subsequent plunging, and perhaps running away.'—*The Veterinarian*, by Messrs. Percival and Youatt, vol. i. p. 96.

Tripping.—He must be a skilful practitioner or a mere pretender who promises to remedy this habit. If it arises from a heavy forehand, and the fore legs being too much under the horse, no one can alter the natural frame of the beast: if it proceeds from tenderness of the foot, grogginess, or old lameness, these ailments are seldom cured; and if it is to be traced to habitual carelessness and idleness, no whipping will rouse the drone. A known stumbler should never be ridden, or driven alone, by any one who values his safety or his life. A tight hand or a strong bearing-rein are precautions that should not be neglected, but they are generally of little avail; for the inveterate stumbler will rarely try to save himself, and this tight rein may sooner and farther precipitate the rider. If, after a trip, the horse suddenly starts forward, and endeavours to break into a canter, the rider or driver may be assured that others before him have fruitlessly endeavoured to remedy the nuisance.

If the stubler has the foot kept as short and the toe pared as close as safety will permit, and the shoe be rounded at the toe, or have that shape given to it which it naturally acquires in a fortnight from the action of such a horse, the animal may not stumble quite so much; or if the disease which produced the habit can be alleviated, some trifling good may be done, but in almost every case a stumbler should be got rid of, or put to slow and heavy work. If the latter alternative be adopted, he may trip as much as he pleases, for the weight of the load and the motion of the other horses will keep him upon his legs.

Weaving.—This consists in a motion of the head, neck, and body, from side to side, like the shuttle of a weaver passing through the web, and hence the name which is given to this peculiar and incessant action. It indicates an impatient, irritable temper, and a dislike to the confinement of the stable; and a horse that is thus incessantly on the fret will seldom carry flesh, or be safe to ride or drive. There is no cure for it, but the close tying up of the animal, except at feeding time.

ART. LXVII. —*On Gardening—No. 5; by* ALEXANDER GORDON.

[FROM THE GENESEE FARMER.]

If I were to follow my original intentions, this essay, (if it deserves the name,) would be dedicated to a different branch of gardening, as the present period is so proper for sowing various sorts of vegetables, but the solicitations for *instructions* for planting a flower garden are so numerous, and I find the principal part of my correspondents on that interesting subject are *Ladies*, I cheerfully wave my own intentions to comply with the wishes of my fair patrons, conscious that from their influence, and by their example, this branch of gardening is to emanate, succeed and prosper.

The formation of a flower garden has already been described in the Farmer; and the planting has also been explained as respects *perennial plants*, but as *annuals* will, I presume, for amateurs, be for sometime the adopted ornaments of *summer* gardens, I think it best to confine myself at present to *their culture.*

The growing of hardy annual flowers is one of the simplest operations connected with gardening, yet one which conduces more in creating a taste for Flora's beauties than all other branches of the art combined together. The vivid hues displayed by nature in these productions of our sublunary world, are, like many others, calculated to captivate for the moment, but the effects are evanescent. *Perennial* flowers lead the mind to a higher source: their developement, their progress, and their maturity, give us a distinct idea of childhood, youth and manhood, and their permanency impresses on our minds that there is a futurity which has no termination. But as annuals is the *theme*, I shall proceed to the subject.

All annuals require a very light, friable soil; they should be sown in a circumferance not exceeding eight inches in diameter, at a distance of about two feet apart, and the taller growing sorts invariably placed in the distance, (that is, furtherest from the walk or lawn.) Scatter the seeds in the allotted space, according to their size, which is a good criterian in general as to their growths, and cover them over in proportion, according to their size, from one-fourth of an inch to an inch, with fine rich mould, which is the only point of consequence that generally attends the raising of annual flowers.

Yours, very respectfully,

ALEXANDER GORDON.

Rochester Nursery, April 12, 1833.

Art. LXVIII.—*Under Draining; by* B.

[FROM THE GENESEE FARMER.]

This is particularly beneficial in collecting the waters of springs, and those which settle upon a tenacious subsoil, and in conducting them to open drains, without their prejudicing the crops. Earths are deposited in strata, generally in an inclining position. Many of these which underlay the proper soil are tenacious or compact, and obstruct the free passage of water which settles upon them from the surface, or presses for vent from beneath. Many of these strata have been worn through by the passage of water, and caused depressions of surface, turned valleys, swales, swamps, &c. which in process of time have naturally acquired a new soil and were covered with vegetation. The waters falling upon the surface of the earth, settle through the porous soil until they reach an impervious stratum, then follow the inclination of this stratum, until forced, by the laws of hydrostatics, to the surface, where they saturate the soil, and render it cold, and uncongenial to cultivated crops. These waters often find their way to the surface upon the upper portions of extensive slopes, and extend their influence to their base, but are most frequently met with near the margin of swamps and in ravines. Hence drains through the centre of ravines and swamps are often found inadequate to render them dry and tillable. If a drain is cut *above* where these waters first appear, down to or into the impervious stratum, they are of course arrested in their passage to the surface, and produce no injury. Sometimes by boring through the compact statum, water will flow through the aperture from below it in quantities, which might prove injurious to a lower level. These perforations should be made at right angles with the slope of the stratum. As no benefit, but an actual loss in labour and in land, results from having these drains open, they should invariably be covered, and hence are denominated under drains. Their site and extent can only be determined by observation of the ground; but their benefit is sure at every point where water runs through the soil.

Under drains are constructed in various ways. They should always be so deep that a plough may pass freely over them, without disturbing the materials of which they are made, and if practicable penetrate somewhat the compact stratum. They are less liable to get out of repair where there is a constant flow of water than where there is none. The most common way is to construct them of stone or of brush wood, though in Europe, tile, and sometimes sod, is used. Stone is preferable where it can be

conveniently had. The sides of an under drain may be perpendicular, and the width only sufficient to work in with convenience. There should be twelve inches of stone in the bottom, if they are round and laid without order; though it is better, when the material will admit of it, to lay them so as to have a sufficient aperture, with stones at the sides and top, for the water to pass freely. Brush, straw, or the inverted soil, may be thrown upon the stones, to prevent the earth from getting among the stones, and obstructing the free passage of the water. When brush is to be used, such as is three to six inches in diameter at the butt is to be preferred, and evergreens are better than deciduous kinds. They should be used when green, and while in foliage cut them in lengths somewhat longer than the depth of the drain; then begin at the upper end, and lay them in diagonally, the butts down, and the tops near the surface, taking care to adjust the larger sticks so that when they are pressed down the water will find a passage between them, and putting the spray on the top. One man stands upon the brush, treading it down as he progresses in placing it, while another, or a boy, passes it to him. When finished, the ditch is apparently full, but the weight of the earth, when thrown on, presses it into a small space. Another method is practised where the subsoil is hard. The main ditch is made somewhat broader, and a spit taken from the center of the bottom, with a narrow tapering spade, so as to leave a shoulder at the bottom of the main ditch, of six inches or more upon each side, upon which sticks, cut to a proper length, are laid cross wise, and the brush placed horizontally upon those. Another method is to make the drain of three straight sticks of timber, two laid in the bottom of the ditch so far apart that the third shall serve as a cover to the space between them.

As to the utility of under draining I can speak from observation and experience. That excellent farmer, H. W. Delavan, whose improvements at Ballston afford an example of good husbandry, has given it an efficient trial, both on wet slopes and level surface. His materials are stone, with which his lands abound. And he has happily contrived to supply watering troughs for his cattle, upon the lower sides of his fields, with the water which flows in these drains. Such has been their ameliorating influence upon the soil, that, under judicious management, his crops, in the fields under drained, have been quadrupled in a few years. My own experience has been alike satisfactory. I have from a mile and a half to two miles of under draining upon my farm. In every case it has converted useless poachy land into kind fertile soils, adapted either to tillage or the fine grasses. Brush is the principal material I have employed. The asking price of the man who made a considerable portion

of my drain, was five shillings for twenty-eight yards, the materials being furnished on the spot. The drains were made in sand, generally terminating in clay, and of an average depth of three feet. B.

Art. LXIX.—*Transplanting Trees.*

[In a notice taken in the *Genesee Farmer* of the "New American Orchardist," the writer after paying a high compliment to the work, we find the following remarks relative to Transplanting Trees.]

Lest, however, our approbation should be deemed unqualified, it may be well to remark, that there are some passages in the work to which we cannot tacitly subscribe. They involve principles, however, upon which the orchadists have been, and are, divided in opinion; and our object in questioning their correctness, is rather to invite investigation, and elicit truth, than to fault Mr. Kenrick. Among the passages noted in our cursory perusal, as questionable on the score of correctness, are the following:

In page 20, introduction, on the subject of planting, Mr. Kenrick says: "The peach, the plum and cherry, and evergreen trees, are thought by many to answer best by being transplanted in spring." This language is too equivocal for a practical man, whose province and whose object are to instruct others; and the inference left to be drawn in favour of spring planting, seems at variance with our best pomological authorities. Professor Lindley, who holds a pre-eminent rank among practical as well as scientific horticulturists, is decidedly in favour of planting in autumn, as preferable to spring planting. There is no doubt, because experience every affords ample demonstration of the fact, that trees ordinarily grow, whether transplanted in spring or autumn; but the question at issue is, which season is the best. And where practical men doubt, or differ, it is well to call in the aid of science, as umpire. It seems now to be admitted, that the sap is to be elaborated by the leaves ere it becomes wood; and that the elaborated sap continues to descend, and to be transmuted into wood, and particularly into radical fibrils, after the leaves have ceased to perform their functions, in autumn. Upon these data it follows, that if a tree is transplanted early in

autumn, it prov 'es itself with a new set of mouths* for absorbing the vernal supplies of food which nature provides, ere the circulation is seriously retarded, or checked, by the frost of winter. The tree, besides, becomes settled and firm, and the earth is brought in complete contact with the roots, by the influence of the early and latter rains, ere a new foliage puts forth. Whereas, if the tree is planted in the spring, the supply of elaborated food, of the preceding year, is apt to be exhausted before new mouths can be furnished to replace the exhaustion; and although the buds may unfold, they are more liable to fail, for want of an early supply of sap from the roots. Our personal experience would seem to warrant the conclusion, that the best season for planting decidous trees, *i. e.* those which shed their leaves annually, is the autumn; and that the sooner the operation is performed after the leaves become useless to the plant, the better.

A different rule applies to evergreens. Both theory and practice warrant us in saying, that these should be transplanted, either early in autumn, or late in the spring, *while the plant is in a state of actual growth*, and the evaporation not great—in September or May, the latter being preferable on account of the flow of sap being then more abundant, a necessary requisite to retain the foliage, and to supply the waste of moisture by evaporation.

Page 107, Mr. Kenrick says, "the most suitable season for pruning is that interval between the time the frost is out of the ground in spring, and the opening of the leaf."

In the former number of the Farmer, we gave quotations from a treatise on planting, which indicated a preference for summer pruning; and we added practical observations in support of the advantages of the new practice. These it will be unnecessary to recapitulate. The arguments in favour of summer pruning were briefly these:

1. That it causes no loss of sap.
2. That the wounds readily heal, by the aid of alreadily descending elaborated sap. And,
3. That shoots seldom grow from the edges of the wounds.

And that none of these advantages result from spring, autumn or winter pruning. B.

* These will grow after the tree becomes leafless, and even in winter, the reservoir of elaborated food being sufficiently abundant to produce them; but they are destroyed or greatly diminished in the ordinary process of transplanting.

PART III.

MISCELLANEOUS INTELLIGENCE.

Soap Ley—Has been accidentally discovered by a soap-boiler to be excellent for garden walks or house yards. He spread in a wet state the black sulphurous residuum of the ley tubs on the alleys of his garden—which would not raise any grass or weeds afterwards, nor permit any growth within some inches of the place. Delighted with the discovery, he had merely to put a covering of the sand over the refuse to obtain the finest walks possible—and having had occasion to repave the yard, he used the like soft refuse instead of mortar, which soon hardened, and cemented the stones so well that the heaviest carriages occasioned no disadjustment.—*Silliman's Journal.*

Domestic Wines.—An exhibition of Domestic Wines took place at the Clinton House in this village on the 8th July, at which as many as fifteen specimens of Grape and Current Wines were offered for examination. To speak of them particularly would require more room than we can devote to the subject at this time. We intended, however, to take it up hereafter and give the process by which the finest samples were produced. The specimens were all manufactured, *without any distilled spirits having been added*, and were such as might be drank with satisfaction. The company were unanimous in their opinions that the manufacture of *pure, light, domestic wines*, would be found not only to contribute to national wealth, but that they prove the most powerful auxiliaries to the cause of temperance It was not to be expected that each experiment in this case should have proved equally successful; but, taken collectively, they afforded abundant proof that there had been great improvements made in the manufacture of domestic wines within the last few years. Some of the specimens produced were of that quality that they will command, in this market, from one to two dollars per gallon, although we doubt whether the first cost of them would amount to thirty-seven and a half cents. The friends of Temperance should encourage the manufacture of light wines, as their effect upon the system is not so deleterious as cider or strong beer. *Those countries are most temperate where the common beverage is light wines.*—*Gen. Far.*

Method of obtaining Cream from Milk.—A process of divesting the milk of its component portion of cream, to an extent hitherto unattainable, has been effected by Mr. George Carter, of Nottingham Lodge, and is thus detailed by that gentleman, in a paper presented to the Society of Arts:—"A peculiar process of extracting cream from milk, by which a superior richness is produced in the cream, has long been known and practised in Dovenshire; this produce of dairies of that county being well known to every one by the name of "clotted," or "clouted cream." As there is no peculiarity in the milk from which this fluid is extracted, it has been frequently a matter of surprise, that the process has not been adopted in other parts of the kingdom. A four sided vessel if formed of zinc plates, twelve inches long, eight inches wide, and six inches deep, with a false bottom, at one-half the depth. The only communication with the lower compartment is by the lip, through which it may be filled or emptied. Having first placed at the bottom of the upper

compartment, a plate of perforated zinc, the area of which is equal to that of the false bottom, a gallon (or any given quantity) of milk is poured (immediately when drawn from the cow) into it, and must remain there, at rest, for twelve hours; an equal quantity of boiling water must then be poured into the lower compartment, through the lip; it is then permitted to stand twelve hours more, (*i. e.* twenty-four hours altogether,) when the cream will be found perfect, and of such consistence, that the whole may be lifted off by the finger and thumb. It is, however, more effectually removed, by gently raising the plate of perforated zinc, from the bottom, by the ringed handles, by which means, the whole of the cream is lifted off in a sheet, without re-mixing any of it with the milk below. With this apparatus, I have instituted a series of experiments; and as a mean of twelve successive ones, I obtained the following results—four gallons of milk, treated as above, produced, in twenty-four hours, four and a half pints of clotted cream, which after churning only fifteen minutes, gave forty ounces of butter—four gallons of milk, treated in the common mode, in earthenware pans, and standing forty eight hours, produced four pints of cream, which, after churning ninety minutes, gave thirty-six ounces of butter. The increase in the quantity of cream, therefore, is twelve and a half per cent. and of butter upwards of eleven per cent. The experimental farmer will instantly perceive the advantages accruing from its adoption, and probably his attention to the subject may produce greater results. I shall feel richly rewarded, if, by exciting an interest on the subject, I can produce any, the slightest improvement in the quality or mode of producing an article, which may properly be deemed one of the necessaries of life."

Amer. Far.

Useful Table.—The number of plants which may be planted on an acre—160 rods or poles—4840 yards—43,560 feet, is as follows:—

Ft. apart.	*No. plants.*	*Ft. apart.*	*No. plants.*
1	43,560	11	360
1½	19,360	12	302
2	10,890	13	257
2½	6,969	14	222
3	4,840	15	193
3½	3,556	16	170
4	2.722	17	150
4½	2,151	18	134
5	1,742	19	120
6	1,210	20	108
7	889	25	69
8	680	30	48
9	537	35	35
10	435	40	27

N. E. Far.

Irish Potatoes.—Mr. M'Roberts—A few years ago, I planted my crop of Irish potatoes by cutting the seed in the usual way (omitting to cut the small ones.) I used manure in the drills, and cultivated the land in the usual way, but I made no potatoes. There was about half a bushel left of the cut potatoes, which lay in a dry situation about three weeks after I had planted, which I gave to one of my neighbours to plant; from which he made a most excellent crop. This put me to thinking upon the subject. My potatoes come up and grew finely, and seemed to promise a fine crop; I had no faith in the moon, there-I was at a loss to account for my failure. My neighbour cultivated his crop in the common way, and not unlike mine, at first I concluded it was owing to the dry cutting mentioned above—but finally, I thought it must be owing entirely to the season, as the Irish potatoes require moisture at the time the crop is about to be made; to afford which, I adopted the plan of covering the land with straw or stalks from the farm yard. It is better to take the straw

from the farm yard, because the grains of wheat in dry straw will vegetate and destroy the potatoes. I plant my potatoes in drills two feet apart, and place the seed about 12 inches apart in the drill, so that they have room enough to spread without matting in the root. I never work the land after planting, but am particular to cover the land deep enough to prevent the putting up of weeds or grass. Since I have adopted this plan, I have never failed to make good crops. As this is the best season (June) for planting Irish potatoes for winter use, you can, if you deem the information of any use, publish it.

No Subscriber.—*Vir. Far.*

Manures.—Mr. Editor—I intend now to make a few remarks upon my mode of carrying out my manure, by way of concluding my article on the subject of manures.

As soon the winter stock of manure, or any part of it, is ready to cart out, I start out my manure carts (unless the ground it wet) to carrying on the land intended for corn, and get as much out as I can, before I plough the land; which is spread and ploughed under the sod. If I have any of the previous summer manure left on hand, I prefer to spread that upon the fresh ploughed land, and harrow or lightly plough in, on account of its being better rotted. As to manuring corn in the hill, I do not practice it, as I always go for the future good condition of the land, more than any *one* crop.

I generally have a bit of ground to sow to oats in the spring, upon which I carry out my early summer manure after harvest, and then fallow the same for wheat.

When my corn land is ready for seeding, (which never is, until I have gotten the corn and stalks off the ground) my carts begin to carry out such manure as may be on hand, to the poorest part of my corn land, and continue until I am done sowing, which is generally late; as I wait to get the corn hauled off the ground, I am unable to commence as early as my neighbours on that kind of land. It will not do when I have furrowed and dressed off my wheat lots to be running carts in for the corn and stalks

As to the most economical mode of giving manure to land, my opinion is, that it will be found in that of applying it in the preparation for the wheat crop, but the prudent farmer must give it to something just as fast as he can make it ready, else not only is the interest lost, but a good per cent. of the principal also.

I would here suggest an improvement in the plan usually pursued in carting out manure upon the land. It is this—when I am about to commence the manuring process. I provide myself with an arm full of small sticks, three or four feet long, newly split out, that they may be the more readily seen by the carters, which I stick down about on the ground to be operated upon, one where every load is to go. Thus, if the land is poor, and I design to put fifty loads to the acre, I fix that number of sticks, regularly, or irregularly, according to the need of the land as I myself may judge. Thus I can lay off two or three days' work for as many carts any time beforehand that suits me. This, I think, is better than the common mode hereabouts. The carter is directed to carry out upon a certain hill or otherwise as may be—he perhaps puts some about and about—on ground that would require fifty loads, he puts twenty; and on land that would have done with twenty, he puts fifty loads at unsuitable distances from each other, then, after hands are sent to spread the manure, perhaps a week or two before the plough goes, and with sticks and hoes, they pull the piles about a little, giving to some spots too much, and to others none; and the consequence is a very irregular crop.

In order to do this spreading business well (and no business of the farmer is more important) every hand should be provided with a long-handle shovel; then at a throw, they can easily spread to the half way distance between the piles.

Success attend you gentlemen—it is late at night, and I am tired, having sown wheat on a very steep knoll of ground to-day. J. T. Jones.

Spring Hills, Oct. 13, 1832.—Virg. Far.

Manures.—In England where population is crowded, and the price of land high, agriculture is more studied and carried to greater perfection. Divers experiments have satisfied careful English agriculturists that a great proportion of the strength of stable and barnyard manure is wasted by evaporation. Mr. Formby, a farmer near Liverpool, has ascertained by careful experiment, that the manure which he purchased in the city stables, in narrow yards, and between high brick walls, protected from the sun and winds, trodden down and rooted over by pigs, and altogether green, or unrotted, is twice as fertilizing as that from his own barnyard, although he also has pigs in his barnyard; but his yard is large, and exposed to the sun and winds. Many of the English farmers, and some in this country, construct their barnyards with a large vault or cistern, on the lower side of the yard, so as to receive the wash of the yard, with a large wooden fawcet on the downhill side, to draw it directly into vats or tubs set on wheels and drawn into the field. The yard should be covered in a great measure by sheds, and the water from the eaves carried away by spouts. Shape the ground so that no water shall run into the yard which falls outside, and that none that falls into it shall run out, washing away the strength of the manure. The fermentation, or rotting of manure, carries off into the atmosphere most of the ammonia and other salts and other gases which serve to fertilize the earth, and could be saved by ploughing in the manure green. And it should be ploughed in as soon as carted out. Or if carted out sometime before ploughing, leave it in large heaps till ready to be ploughed in.—*Kentucky Jour.*

Poultry.—Fowls of every sort may be profitably fed on boiled potatoes and meal mixed. Hens which do not lay in winter, should have access to pounded bones, oyster shells, or some other matter which contains lime, in some of its compound, because something of the kind is necessary to form the shells of the eggs, which are composed of the phosphate of lime.

Cobbett's Cottage of Economy observes that pullets, that is, birds hatched the foregoing spring, are the best laying hens in winter. "At any rate let them not be more than two or three years old. They should be kept in a warm place, and not let out even in the day time in wet weather; for one good sound wetting will keep them back a fortnight. The dry cold, even in the severest cold, if dry, is less injurious than even a little wett in winter time. If the feathers get wet, in our climate in winter, or in short days they do not get dry for a long time; and this it is that spoils and kills many of our fowls.

"The French, who are great egg eaters, take great pains as to the food of laying hens in winter. They let them out but very little, even in their fine climate, and give them very stimulating food; barley boiled and given them warm; curds, buckwheat, (which I believe is the best thing of all, excepting curds,) parsley, and other herbs chopped fine; oats and wheat sifted; and sometimes they give them hemp seed, and the seed of nettles; or dried nettles, harvested in summer and boiled in winter. Some give them ordinary food, and once a day toasted bread sopped in wine. White cabbages chopped up are very good for all sorts of poultry."

It has been said by other writers, that poultry, as well as pigs, are much benefited by placing charcoal, broken into small pieces, in situations to which they have access. This substance, it is said, adds to the appetites, and helps the digestion of these animals; and, as it is cheap, and cannot be possibly injurious, it may be advisable to use it as a constituent for their diet.

A proportion of animal food, mixed with vegetable food, is said to cause poultry to thrive much faster than they would otherwise. If they have space to range in, where they can pick up grasshoppers and other insects, they will thrive faster. But they should for some time before they are killed for eating, be fed exclusively, on food which will not have a tendency to give a bad relish to their flesh.—*N. E. Far.*